



FRIDAY, DEC. 5.

CONTENTS.

ILLUSTRATIONS:	PAGE.	EDITORIALS:	PAGE.
The Trojan Automatic Car Coupler.....	834	A Collision Under the Block System.....	843
Hall Automatic Block Signals on the New York Central & Hudson River R. E.....	835	International Railroad Law in Europe.....	843
Swing-Motion Trucks—Western Railway Club.....	836	The United States Report on Railroad Labor.....	843
Blocks for Wrecking Outfits.....	837	A Wreck on a Trestle.....	844
Floor Systems of Trestle Bridges.....	838	EDITORIAL NOTES.....	842-845
Swivel Truck for Street Cars.....	838	NEW PUBLICATIONS.....	845
Schroyer-Thompson Air Brake Travel Indicator.....	839	GENERAL NEWS:	
Reynolds' Patent Improved Baggage Truck.....	839	Locomotive Building.....	846
Fastenings for Steel Tires—Western Railway Club.....	840	Car Building.....	846
CONTRIBUTIONS:		Bridge Building.....	846
The Duties of Superintendents of Motive Power.....	833	Meetings and Announcements.....	846
English and American Passenger Rates.....	833	Personal.....	847
Operating Officers' Salaries.....	833	Elections and Appointments.....	847
Railroad Rates and Vested Interests.....	833	Railroad Construction.....	848
The Uses of Audible Signals.....	833	General Railroad News.....	850
Reasons for Solid Bridge Floors.....	834	Traffic.....	850
EDITORIALS:		MISCELLANEOUS:	
The Swing-Beam Trucks.....	842	Technical.....	845
		The Scrap Heap.....	845
		Draft Rigging—Western Railway Club.....	837
		The Barnes Water Purger on the Wabash.....	838
		A North River Bridge.....	838
		The Counselman Case.....	839

Contributions.

The Duties of Superintendents of Motive Power.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In going about among Master Mechanics and Superintendents of Motive Power, I find in some cases, where they have many miles of road to look after, that they are so overcrowded with work that they have not sufficient time to attend to any one individual duty as they would like to, and as a consequence, even after working long hours and Sundays, they are behind rather than ahead of their work. There must be some reason for crowding the chief mechanical man on a road other than I can determine. In no other line of business with which I am acquainted does the leading man work under such a heavy load as in the mechanical department of a railroad. As a class they seem to be loaded with engineers' complaints, reports of drunkenness, non-conformance with dispatchers' orders, etc., etc., all of which is, so far as I can see, foreign to their office or to their legitimate duties.

What is the necessity for this attention to minor duties on the part of the chief officers of the mechanical department to such an extent that they are obliged to leave the real supervision of the mechanical construction to subordinates, and waste time in clerical and detective duties? Why should not the Superintendent's office care for the management of engineers and firemen and their complaints?

TRAVELER.

English and American Passenger Rates.

NO. 150 LEXINGTON AVENUE,  
NEW YORK, NOV. 17, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The *Railroad Gazette* is usually so accurate in its statements that they can generally be taken without question; but there is one in the issue for Nov. 14 that seem open to criticism.

In the editorial on "Conditions Affecting Passenger Traffic" the writer says: "The average Massachusetts rate (1.9 per mile) is about the same as the third-class rate in England. Barring roads in thinly settled districts, the difference between American and English passenger fares in general is not very great."

I have always been under the impression, received through several visits to England, that the rate there is much higher than in the United States. If I mistake not, the first-class rate is generally two pence per mile, second-class one and one-half pence and the third (parliamentary) one penny. Poor's Manual for 1889 gives the average rate in the United States 2.17 cents per mile.

The Rev. Dr. Behrends, in a lecture read in the Cooper Institute on Saturday evening, Nov. 15, in speaking of the difference of rates, gave the English average as 4.42 cents per mile and the United States as 2.18. He may not be an authority on railroad subjects, but he would probably verify his statements before giving them to the public.

I am loth to question the accuracy of the *Gazette*, but when it says "that the difference between English and American rates is not very great" I am forced to believe it is in error.

DOUBTER.

["If 'Doubter' will go to Massachusetts and try to buy an ordinary ticket for less than two cents a mile, he will find that he has made a mistake in supposing that the Massachusetts rate is lower than the English third-class rate. Unless he selects his road with care, he will find the Massachusetts rate the higher. Of course he can get carried cheaper by buying a com-

mutation ticket; but so he can in England. His mistake lies in comparing the average receipts per passenger mile in Massachusetts, and in the United States generally, with the regular ticket rates in England. In a later editorial, Nov. 28, we treated this whole matter at length, and mentioned the error of General Horace Porter's statement in Scribner's "American Railway," which Dr. Behrends has evidently quoted inaccurately.—EDITOR RAILROAD GAZETTE.]

Operating Officers' Salaries.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The following item is going the rounds of the newspapers in Massachusetts:

It is said that President Bliss, of the Boston & Albany, was recently offered an increase of salary from \$12,000 to \$20,000, but declined because he did not consider his services worth so much more. Besides, he said, "If I accept it will be necessary to raise the salaries of my fellow-officials proportionately, and that would entail a heavy increase in expenses."

One of the papers which quotes it commends the "management" of the road for administering the property in the interest of its owners rather than for their own personal benefit. But in the name of the hundreds of hard worked operating officers of American railroads, I beg to mildly protest. Mr. Bliss is a heavy stockholder in the road and is doubtless a millionaire. He very likely can well afford to perform his duties for nothing. But to get behind this fact and argue for restricting the salaries of other men, who are without wealth and must depend upon their abilities for a livelihood, is decidedly unfair. The general manager, the general superintendent, the division superintendent and others have a fair right to have their salaries based on the market value of such talent, as judged by general experience. An operating officer of a railroad cannot profitably strike; he could not do so, even if there were hundreds of him, because he cannot qualify himself to fill a place of the same grade on another road without at least a year's training. As the *Railroad Gazette* has lately pointed out, a man must be very familiar with his surroundings before he can fill such a place.

A road like Boston & Albany, earning \$9,000,000 yearly, ought to pay its President \$20,000, if it ought to pay him a cent. The General Manager of such a road should be worth \$15,000. That is what general managers get in similar places elsewhere. The Boston & Albany needs a \$10,000 man for General Superintendent. If it has a good one and pays him less than this, it is simply taking advantage of him. The Division Superintendents ought to have \$5,000 a year, if they properly fill their places. To disregard these self-evident propositions and gauge the salaries by the figure asked by a millionaire is "too thin."

If you look at the best managed roads throughout the country, you will find these officers either (1) getting these salaries and giving the equivalent in service, or (2) receiving less and not properly filling the office, or (3) doing good work for poor pay, and keeping a constant *outlet* for an opening in some other business. This last is what loses railroads thousands of dollars yearly. The good men not only look for good places elsewhere, but they find and accept them.

G. M.

Railroad Rates and Vested Interests.

NEWTON, Ia., Nov. 12, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your editorial of Nov. 7, with above caption, you say "it is a contest between Kansas City and Chicago." One can hardly do you the injustice to assume that by "Kansas City" you did not mean Missouri River points, for it is hardly presumable that you intended to ignore entirely Omaha and Sioux City. But do you mean to be understood as implying that there is no interest to be regarded between the Missouri River and Chicago? In Iowa such ambitious towns as Des Moines, Ottumwa and Cedar Rapids would be ready to join issue.

Again, you say, "If the conditions of traffic are such that the roads by handling the hog products from Kansas City to Chicago, and the return freights from Chicago to Kansas City, can do the business at less expense than by hauling the live hogs to Chicago direct, it is in the public interest that they should be allowed to do so." Here again the "public interest" must mean only the interests of the "roads," Missouri River points and Chicago. Suppose we change the next sentence, and say if some producers and some consumers pay the same rates in each case, and the railroads make more money by the former method than by the latter, will the *Gazette* still acknowledge it as its editorial?

It is to be feared that the *Gazette* hardly takes a judicial view, and makes mistakes similar to those of our Iowa Railroad Commissioners or leading local newspapers. The former, in the execution of a law designed emphatically to prevent discriminations, admits its intentions to be to foster the interests of a class not claimed to be more than eight per cent. of the people they represent. The latter claims that the interests of two millions of people are entirely coincident with those of its little environment, and always insists that "the farmer," no matter how remote, must be identified with the jobber and manufacturer of its own town.

For example, Des Moines newspapers would like to make it appear that every hog raiser in the state has a direct interest in the success of the Des Moines pork

packer. The Des Moines market price for hogs is usually enough below that of Chicago to allow for freight between the two places and a reasonable profit to the buyer.

The Newton hog buyer wants only a fair field and no favor. We can rarely, if ever, ship the 35 miles westward, and are especially interested in a low interstate rate on live hogs.

Another error it is not worth while to perpetuate; that of considering "the West" a unit in all matters of legislation. However broad-minded we may wish to appear, while Iowa neither asks nor expects special discriminations in her favor, her interests are not always identical with those of trans-Missouri River states, and her representatives are expected to look first to the welfare of their constituents.

A.

[When we said the public interest, we meant the public interest. Any law which interferes with good railroad economy is a costly luxury, whose bad effects are not confined to any small section of producers or consumers.—EDITOR RAILROAD GAZETTE.]

The Uses of Audible Signals.

The Kelsey Railroad Signal Co.,  
FLORENCE, Mass., Nov. 20, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In looking over a back volume of the *Railroad Gazette* we notice in the issue of June 7, 1889, a criticism by George W. Blodgett upon the use of audible signals, in which he says: "No man should be permitted to run a locomotive whose record of service does not show beyond a doubt that he is neither careless nor forgetful. The man who would forget to look at a stationary signal, the location of which he well knew, would forget to shut off steam and apply brakes at an alarm from an audible signal."

If the condition of things were always the same and as simple as the writer of the above criticism places it, then his remarks should have some weight, for we would all agree as to the importance of the rule he cites in the first sentence quoted, although we cannot find an infallible engineman or any other human being who can be warranted perfect. Men who have for years been neither careless nor forgetful, and who were considered thoroughly reliable, have run past signals at danger, causing serious damage, in a moment of forgetfulness. The second sentence, that an engineman who had forgotten a signal would disregard it when called to his attention, is too absurd for serious consideration.

An apparently reliable man may forget; signals may be placed where it is difficult to see them; new men may misunderstand or mistake signals when complicated or obscured from their vision by fog, smoke or other causes. The *Railroad Gazette* frequently mentions instances of enginemen who have run past signals at danger who have never been known to be so careless before. If they had been warned by an audible signal of the position of the visual signal, steam would have been shut off and brakes applied in every one of these cases without a doubt.

We have read during the past eight months of five derailments by derailing switches at drawbridges, where serious damage was done to rolling stock and much delay to traffic occasioned. We will refer to but one of them, although we could probably point a moral in connection with each. In this one it was proved beyond a doubt that the engineman ran past the distant signal at danger. He in defence claimed that he had a clear distant signal, but that when he arrived at the home signal he had not time for stopping the train, and was consequently derailed. If an audible signal had warned him of the position of the distant signal he would have had his train under control at the home signal and would have saved derailment, loss of time to traffic and his position.

Here is a possible situation. A distant signal has been set to danger after the locomotive has passed it, and the engineman is consequently expecting to find the home signal at clear. The result is disaster. With an audible signal that sounded an alarm for every wheel of a passing train, the trainmen would hear it, and if properly instructed could signal the engineman or apply the brakes by means of the conductor's valve. General Hutchinson, of the British Board of Trade, in a recent report alludes to the great value of an automatic audible signal.

Not only fog hides visual signals from the view of enginemen, but blinding snowstorms. A train on the Canadian Pacific ran into an open draw during a severe snowstorm, and numerous other similar wrecks could be mentioned which audible signals would have prevented.

The visual signals at the Eighty-sixth, Seventy-second and Fifty-ninth street block stations in the Harlem tunnel, near the Grand Central station, New York City, are often obscured by fog and smoke, so that an engineman 10 ft. away could not locate them. The southbound "rapid transit" (outside) track has automatic audible indicator signals 300 ft. in advance of each of the home signals to assist the engineman in locating the latter. How quickly the engineman hears the gong when he is straining his eyes trying to locate the home signal while feeling his way through the tunnel in the fog and smoke. The demands of the public and the interest of the rail-



roads call not only for capable, reliable engineers, but the use also of every mechanical appliance that will assist them in the discharge of their responsible duties. The car is a servant of as great importance to us as the eye, and only when each supplements the other are the best results attained.

FRANK N. KELSEY, Superintendent.

#### Reasons for Solid Bridge Floors.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The articles you have published on solid bridge floors have been of interest not only to the bridge experts who are specially engaged in designing bridges, but to the general engineer who, without devoting his time exclusively or largely to bridging, still wishes to have an intelligent knowledge of whatever is desirable in bridging and the reasons why it is desirable. As nearly as can be gathered from bridge specialists, the points in favor are the following:

1. That the materials added in making the "solid floor," such as ballast, gravel, etc., increase the durability of the bridge by acting as a cushion. The strained molecules of the iron work are given time and space to "pull themselves" (or their constituent atoms) "together," by having more independent and movable pieces of material between them and the blow. To take an illustration from nature, when a man is threatened with a heavy blow over the shoulders, note what instinct leads him to do. It is not to stiffen his arms in the line of the blow and place his hands upon unyielding bearings. He endeavors to have the blow pass through his body to his feet, with many parts intervening each to take up a portion of the blow. Each joint is bent and placed in readiness for such further bending as may be advantageous in lessening the effects, and the shoulder is further placed in position to act as a cushion. The more nearly we can approach this process in bridge designing, the more gently will the superstructure be treated, and the greater its durability. Bridge superstructures should be treated more like things of life. At least they should not be laid on the anvil of a rigid stone abutment and pounded while in an unyielding form. The more the bridge material is relieved of the somewhat improper work of opposing sudden and repeated blows, and is left to its proper work of sustaining simple weight, the better. This is why the solid bridge floor (somewhat unfortunately named "solid") is a step in advance.

2. It is claimed that the increase of weight increases the real strength and durability of the bridge within certain limits. The body that is struck is larger in proportion to the blow. A blow from a boy will not be felt much by a large man, and still less by an elephant. To some extent, this is but a modification of the cushioning above referred to. The "factor of safety" may be lessened by the added weight, but the duration of the bridge and its actual safety are increased.

3. The third advantage of the solid bridge floor (perhaps to some engineers the first and only apparent one) is the continuity and increased safety of the roadbed.

It now remains for the bridge engineers to determine whether the material used to secure these advantages is the best material possible. This problem they will work out gradually, perhaps reaching in time an arrangement much better than that of continuing the common roadbed materials out upon the bridges. The mere fact that these materials exist at each end of the bridge and give the roadbed an unbroken and uniform appearance should not decide the question. The proper cross section and material for the bridge floor should be studied independently of this. So far as effects of derailment are concerned, a system of long ties close together, and with proper precautions taken against their bunching, is better than a softer material into which a wheel can sink and in which the wheel, if turned, meets opposing substances tending both to retard it and to turn it still further from its proper course. As for the "cushioning" first named, it is not likely that ballast, gravel, etc., would have been selected had they not existed as part of the adjacent roadbed. To determine approximately what the action is upon and through such materials will require considerable experimenting. For cushioning purposes, perhaps a combination of softer woods, or of wood and still softer materials, will come into use in the bridge floor. This is already done on the New York Central road, so far as the relation of the superstructure to the abutment is concerned, in the asphalt cushion used in the bed plates of their bridges. The principle might be extended to the arrangement of the floor system, or the felt sole plates, so largely used in Europe, be introduced in some modified form.

In connection with this subject it is worthy of note that pile and wooden piers and abutments, so long as they last, give to some extent this elastic cushioning, and are in this respect preferable to rigid masonry structures, if they be not of poor construction and too elastic. They are to the bridge what springs are to the coach.

ARCHIBALD A. SCHENCK.

#### The Trojan Automatic Car Coupler.

There is no lack of new designs of vertical plane couplers, within the Master Car Builders' standard, and apparently we need not fear that holding inventors

strictly to the lines will injuriously restrict invention. Two new couplers have appeared very recently; one of them, the Trojan, made by Messrs. Burden, Renshaw & Co., of Troy, N. Y., is illustrated in the cuts herewith.

Fig. 1 is an exterior view of the top of coupler complete. Fig. 2 is a plan and section with knuckle open, and fig. 3 is the same view with the knuckle closed. In fig. 2 there

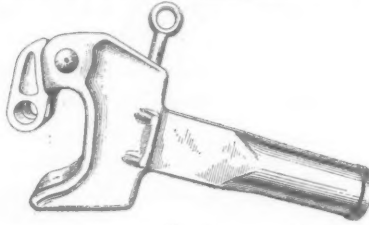


Fig. 1.

appears on the knuckle a rib between the lock block and the finger. This is a draughtman's error. There is no such rib. Fig. 4 is a plan in section of the drawhead, showing the recess for the knuckle and locking block, and the bearing for the rod which lifts the lock. Fig. 5 is a front view of the drawhead with the knuckle removed. All of these illustrations have been drawn from photographs, and show very completely the locking arrangement and the method of operating it.

It will be seen that the knuckle is locked by the block B, which drops in front of the shank and gives nearly 4 sq. in. bearing surface in locking. The rod which passes through the side of the drawhead and through this locking block is flat where it passes through the block, which is thus raised and lowered by the rotation of the rod. Carried on this rod is the finger A, which does not rotate with the rod, but moves to right and left with the rod, as the latter is pushed in or drawn out. When the knuckle is released by lifting the lock block, as shown in fig. 2, it is opened by

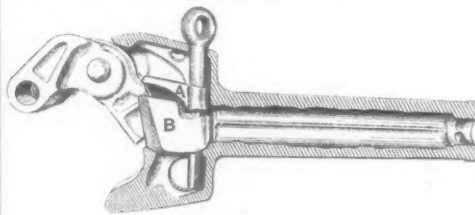


Fig. 2.

pushing in the rod, as the finger A bears against the shank of the knuckle. By this arrangement there is no necessity for a man to go between the cars to open the knuckles for coupling. This, of course, is one of the defects in other M. C. B. couplers, and is one particular in which they fall short of giving that security to trainmen and yardmen which is one of the great objects to accomplish which the type is designed and adopted.

The locking rod is worked from the side of the car by a 1-in. round, operating rod with an eye at one end and the other end turned up for a crank. The eye of this operating rod engages in the eye of the locking rod and by giving it a turn the lock block is lifted. The operating rod is carried by a bent plate at the side of the car, which has a suitable arrangement by which the operating rod may be set to hold the lock up when it is desired to set the knuckle not to couple.

The large hole seen in the drawhead casting is to allow cinders or other material to drop out or be easily removed. The locking rod, lock block and finger may be

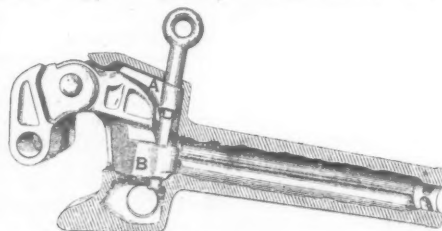


Fig. 3.

easily removed without taking out the knuckle. This is effected by raising the finger to a position where a slot in it comes in line with the lug shown on the rod. The rod may then be withdrawn and the other parts removed through the front of the drawhead. The small hole shown in the drawhead casting, directly below the seat of the finger, permits the finger to be lifted to the position in which it can be disengaged from the rod. When these parts are taken out the tail bolt may be put in without removing the knuckle.

The knuckle is made of steel; the bar and finger A of malleable iron. The lock block is made of hard, gray, cast iron, to diminish the wear against the knuckle. The lock rod is made of malleable iron, wrought iron or steel, and the most desirable of these materials will be selected after enough experience is had to determine which of them is best, all things being considered. The company is prepared to furnish the drawbar of steel also to those who wish to pay the necessarily greater price. The coupler weighs complete between 200 and 205 lbs.

Several tests have been made to determine the strength

of this coupler. Below is given the results of a test made at the West Albany shops of the New York Central, under a drop hammer. The weight of the hammer was 1,600 lbs., and the coupler was set on end with its shank resting on the base block of the testing machine. Before the test the opening of the knuckle was the M. C. B. standard, viz.,  $3\frac{1}{4}$  in.

Results of Test.—First blow, drop 19 ft.; shank of drawbar slightly bowed and the opening reduced  $\frac{1}{8}$  in. Second blow, drop 19 ft.; opening reduced  $\frac{1}{8}$  in. more. Third blow, drop 19 ft. 6 in.; shank of drawbar bowed; one crack appeared in the barrel, slight crack in the knuckle, lock block broken at the back; coupler still operative.

In a test on the Fairbank's testing machine at New York, in which two Trojan bars were coupled together, the tail bolt broke under a tensile stress of 127,000 lbs., and the couplers were in perfect condition. The result of the last test, made Nov. 12, in the same machine, with the comments of Mr. Olsen, the engineer of the tests in charge, is as follows:

Report of tests made for Messrs. Burden & Renshaw:

Material.....	Malleable iron and steel casting.
Shape.....	Car couplers locked together as in service.
Tensile stress in pounds.....	135,880 lbs.

Above couplers were tested as used in service. Drawhead gave way about 8 in. from end. Knuckles not injured. Opened and shut after test without the slightest trouble. Will say it is the strongest coupler now in the market, as it has given the highest results in tensile stress of any coupler so far tested by me. (Signed), N. O. OLSEN, Engineer of Tests.

The fractured shank had its core displaced in casting, and was only  $\frac{1}{8}$  in. thick on one side. In the above



Fig. 4.

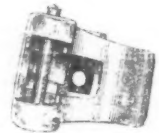


Fig. 5.

tests the knuckle was made of steel and the bar of malleable iron.

Further trial was made with loaded cars on the Delaware & Hudson track at Green Island, N. Y. The cars were gondolas, weighing about 22,000 lbs. each, loaded with about 50,000 lbs. of lumber. One car was standing with the brakes set hard. The other car was pushed against it at a speed of from 15 to 20 miles an hour, as estimated by various railroad men present. This test was repeated three times at each end of the standing car, the couplers being in the condition as ordinarily arranged for service, with standard spindles and  $5\frac{1}{2}$ -in.  $\times$   $6\frac{1}{2}$ -in. double coil springs. Each shock was sufficient to displace the load of lumber about 2 ft. It is said that no injury was done to the couplers.

This coupler is made to conform closely to the standard lines.

#### The Hall Block Signal on the New York Central.

As readers of the *Railroad Gazette* are aware, the automatic electric block system of the Hall Signal Company, which has been in use for two or three years on the Boston & Albany and New York, New Haven & Hartford roads, has recently been applied on an 8-mile section of the New York Central & Hudson River (double track), near Peekskill, N. Y. This application is in various respects more complete than either of the others mentioned, and we print in this issue a diagram showing the arrangement of the signals and giving a general idea of the way in which the road has been equipped.

The portion of line blocked extends from Oscawana on the south to near Roa Hook on the north,  $8\frac{1}{2}$  miles, and there are six blocks on the north bound track and seven on the south bound. Each block has a home and a distant signal.

The theory and construction of this signal were described in the *Railroad Gazette* of Sept. 12, but its main features may be briefly rehearsed here. By means of two wires strung upon poles a metallic circuit is maintained from one end of a block section to the other. The electro-magnet holding the signal at "all clear" is held closed by this circuit and any opening of it causes the signal to fall to "danger." The circuit is opened by each train as it passes the signal at the entrance to the section and the signal at once goes to "danger"; at the same time—that is, by the pressure of the first wheel—a relay is opened which breaks the signal circuit at a point where it cannot be again closed, except by the action of the "clearing" track instrument, which is placed 2,000 ft. beyond the outgoing end of the section. The train on reaching the latter instrument closes the relay and the whole circuit and restores the signal to the clear position. All switches within a section are equipped with a circuit breaker so that whenever they are moved off the main track they open the circuit and set the signal for that section at "danger." Each distant signal works simultaneously with its home signal.

As will be seen by the diagram, the piece of road

blocked is quite crooked, the Peekskill station, especially, being in an obscure location. There are short tunnels near signals 100 and 101 (Oscawana and Crugers) and there is a drawbridge in sections 111 and 112. There is an ascending grade going south from Peekskill where heavy freight trains are liable to lose time, making block signals specially needful. At Peekskill station there is a grade crossing from which the view is very short, and in connection with the block system the signal company has put in bells which seasonably warn the gate tender at this crossing of the approach of trains.

The diagram can be easily read if the meaning of the four principal letters is remembered. These are H, home signal; D, distant signal; B, "block" track instrument, by which a train sets a signal at danger; C, "clearing" track instrument, by which a train restores a signal to the clear position. Thus for block No. 100, D 100 is the distant and H 100 the home signal; when the engine of a train passes B 100 it sets the signal at danger and when it passes C 100 the signal is restored.

Track instrument B 111 also sets a-ringing bells W and X; and B 108 starts bells Y and Z; these bells are silenced by the passage of trains over the track instruments near them. The track instrument for H 107 starts bell B and B 104 starts bell A. These bells are stopped in the same manner as the others. At S, south of C 109, is a private siding. The drawbridge is interlocked not only with signals 111 and 112, but also with 113.

These bells, as also those in the gate tender's cabin, are operated on the same principle as that employed in the automatic highway crossing signal made by this company, which was illustrated in the *Railroad Gazette* of March 28 last. Bells A, B, W, X, Y, Z, as will be seen by reference to the diagram, ring continuously from the time a train approaches within a certain distance until it reaches the bell; and this ringing warns the switch tender not to disturb the main track in the face of the approaching train.

When a train goes into a siding to wait for another train to pass it, the circuit which would ordinarily be closed by the passage of a train over the clearing track instrument for that section is closed by the conductor or trainman by means of a circuit closer fixed near the switch. The switches of crossover tracks are equipped in the same manner. A southbound conductor arriving at Peekskill, for instance, and wishing to go to the freight sidings on the east side of the main line, goes to the switch for the crossover track, and if he hears no warning from bell Z, turns it; this sets H 108 at danger. When he has returned to his own track and set the switch for the main track he uses the hand instrument to restore H 108 to safety.

S 110 is a special signal to indicate the position of the switch connecting with the siding north of it. A number of passenger trains whose trips end at Peekskill run in upon this side track, and the signal is introduced so that they need not run slowly all the way from signal 108.

All these block sections are equipped with auxiliary circuits by means of which trains can be run under the permissive block system, and the track instruments which appear in the diagram without letters are parts of this apparatus. The operation of the permissive circuits can be explained only by means of a diagram (which we expect soon to publish); but in a general way the working may be explained thus: A train enters, say, section 104; it sets H 104 at danger as the engine passes it, by operating B 104; at the same time D 104 goes to caution and warns the following train to slacken its speed. This train finding H 104 showing danger stops two, three or five minutes (as the rule may be) and may then proceed cautiously. When the engine of the first train reaches C 102, this track instrument (whose office is primarily to restore H 102 to the clear position) so arranges the circuits that when the second train passes B 104 (if it does so before the first train goes out of the section) the pressure of its wheels on the lever of B 104 will prevent H 104 being cleared by C 104 when the first train passes the latter. If, however, no train is closely following, the arrangement of circuits produced by C 102 is changed when the first train reaches C 104 and the original condition restored, so that absolute blocking may be resumed.

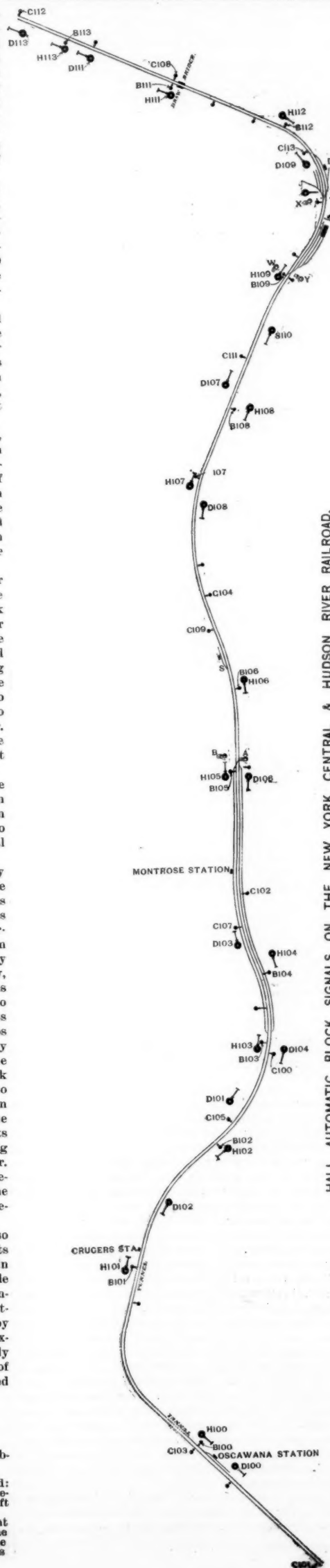
The apparatus for this method of working is not so complicated as it would seem, and it has fulfilled its office perfectly during the two months it has been in use here. The officers of the road say that the whole system has worked very satisfactorily. The only unnecessary stops have been caused by trainmen forgetting to clear signals after entering side tracks, and by improper adjustment of instruments, due to an inexperienced inspector. This last trouble occurred only three times, and these were all during the first week of operation; since that time the apparatus has worked perfectly.

#### Swing Motion Trucks—Western Railway Club.

At the November meeting the discussion of this subject was continued.

The Secretary read a letter from Mr. Geo. Cushing, who said: In the printed report of September club meeting I am reported as favoring the "rigid truck" in considering the "draft of train." The reverse is what was intended.

The swing centre truck has for many years been prominent because it is thought to favor the track, and also relieve the drawbar and end timbers of cars of great strains, and increase the loads possible to haul in passing curves, and especially is



this so, where the M. C. B. type of coupler is used, and in yard service, where frequent and excessive curves are found.

The *Railroad Gazette* of Oct. 3, page 678, illustrates—for another purpose—the positions naturally assumed by the M. C. B. type of coupler on curves, and seems to indicate the necessity for a swing centre to partly relieve the great strains which the diagrams show the drawbar is subject to in these positions, and which must in part, at least, be transferred to the car body and track.

The fact that the repairs of swing centre trucks may be neglected, and cause trouble on the road, should not settle the question entirely in favor of the "rigid truck," with due consideration of the points in favor of the swing motion. Is there not a compensating benefit in its use in passenger and freight cars, in passing curves? If there is in one, why not in both classes of service?

President BAHR: I understand that Mr. Cloud, Secretary of the Master Car Builders' Association, has made some experiments in that regard.

Mr. CLOUD: Those experiments made some years ago were in regard to the relative resistance of the two types of trucks, with a definite object in view when a law case was being tried between the railroad associations and certain patentees; they related to locomotive trucks, and the results would not bear directly upon freight cars.

Mr. D. L. BARNES: I should like to hear from Mr. Cloud what the general result was as to the resistance.

Mr. CLOUD: In so far as rigid and swing motion trucks for freight cars are concerned, I recognize the fact which has been brought out recently, and which is also referred to in Mr. Cushing's communication just read, namely, that the introduction of the Master Car Builders' type of coupler brings in a new condition which the swing motion truck will meet better than the rigid motion truck.

Some years ago the patentees of swing-motion trucks on the forward part of the locomotive brought suit to recover considerable damages for infringement. Although the suit was brought against one railroad company, it was recognized to be a test case, and was defended by the Eastern Railroad Association. In getting the data together to present before that Master, I conducted a great many experiments with a dynamometer to determine the track resistance with both kinds of trucks. The method of procedure was as follows: We pushed the engine around certain curves, measuring the force required to push it at different speeds; and then we blocked the trucks so that the centre plate was held, and again pushed the engine around the curves so as to get at the actual comparative resistances. We were surprised to find that at an average speed we had no less resistance with the swing motion truck than we had with the rigid truck. We had with the swing motion truck a greater variation of resistance; but the aggregate work done in passing a given distance was no less but slightly more with the swing motion truck than with the rigid. The swing motion seemed to allow of a certain amount of play which resulted in a lateral hammering against the rail, as we thought, and as evidenced in the greater resistance of the tire. These results were confirmed by a large number of experiments, and the effect of it was that many railroad companies which had used the swing motion truck under the forward end of the engines abandoned it—not wholly because the resistance was different, but also because a large difference was found in the wear of the driving boxes and hubs. This latter feature, however, has reference only to the locomotive and not to the cars, and is not important in connection with your present subject.

The Secretary read a communication from Mr. D. J. Durrell, of the Illinois Central, in part as follows:

During my remarks at the October meeting I stated that the Illinois Central is having most excellent results from wheel service. I have come to the conclusion that the present satisfactory results have been attained by those in charge of our Machinery Department; not alone by the quality of wheels used, but by the construction of the truck itself, with a view of obviating the wear upon the body of the car, upon the trucks, and upon the wheels and other separate parts forming the trucks.

I gave for the satisfactory wheel service we were having three reasons. 1st, the use of a swing type of truck, 2d, the use of a long hanger, and 3d, the use of a large wheel, and I will endeavor to explain my reasons as briefly as possible.

I say the use of a swing truck, as some one at the last meeting stated that a swing truck was a good thing when the car was not loaded to exceed 40,000 lbs., but of no use when the car was loaded beyond that. I desire to go further and get up to cars loaded to 62,500 and 63,000 lbs. With a swing motion centre with long hanger and large wheel, I have repeatedly noticed that cars in passing over from one track to another did not crowd the rails and that with a rigid truck they did. And what was particularly noticeable in the swing motion truck was the easy vibratory motion of the car body. With an imperfection in the track the wheels of a swing motion truck will keep more nearly their normal position on the rail, while the car body riding upon rigid trucks crowded the wheels over and in a number of instances nearly turned the guard rail, and at the same time the noise made by the wheels grinding upon the rails was very pronounced.

Now, the point is this, that if a 60,000-lb. capacity car, loaded beyond its capacity, will curve so much more easily in going from one track to another with sharp tangents, does it not stand to reason that upon main line they will curve with equal freedom, and thereby save the consequent strain upon wheels and the wear of flanges, and if a car with properly constructed trucks does it in one instance, will not the conclusion be that they will do so at other times, and thereby grant a further lease on the life of the wheels? This has been my observation and my natural conclusion drawn therefrom.

Now, in relation to proportion of hangers: I believe, and my belief is the result of experiments and actual practice, that a truck should be so constructed that the length of the hanger should be the distance from point A to point B, fig. 1, less one-half the distance from point B to point C, and that the distance from E to F should be at least 6 in. more than from G to H.

The line D to B represents the points and angle of thrust, of the angle at which the strain is subjected from the point of contact of rail and wheel to the car body. By way of explanation, I would say: Point A is determined by the point of intersection of the centre line of the car body and a line drawn at right angles from the centre of the bolster when the latter is inclined by a curve, as shown in sketch, which shows in dotted lines the body and truck in normal position and in solid lines the same when passing a curve with outer rail raised 3 in.

This angle allows of easy curving of car trucks at any degree of curvature of track and suits itself to the fixed height of outside rail above the height of inside rail on curves. This point A should be, to my mind, the radius point for the curve of the centre castings.

With a truck constructed on this formula, I am satisfied that with a reasonably good track, and a wheel from which reasonable service might be hoped for, you would have very little, if any, flange wear.

Again, in relation to the size of wheels used preventing the wear of flanges: It is a well-known fact that the larger the circumference of a wheel the less power or leverage required to move it, and when once in motion it is the more easily turned, and the result of my researches in this direction is that the distance from the rail to the centre of axle in wheel fit should be to the distance from point of contact of wheel and rail, and radius point of top centre casting A as 1 to 2½.

Regarding the decrease of number of wheels removed



on account of sharp flanges: For the first six months of the present year, we removed in our passenger yard from our passenger equipment, 632 wheels; of the total number removed there were but 11 removed for sharp flanges.

This, you will understand, was from our passenger equipment. If any one can make a better showing for sharp flanges with the mileage that the Illinois Central makes over their entire line, between Chicago and New Orleans and Chicago and Sioux City, of wheels removed at so important a place as Chicago, I should be glad to learn of it and of the style of truck in use.

I have been unable, with the time at my disposal, to get the exact information asked for at the last meeting as regards wheels under freight equipment, but I feel I am safe in saying, from what information I have been able to gather, that the use of the swing motion truck with the long hanger, properly proportioned, and a 36-in. wheel, the decrease will have amounted to a great saving in flange wear of wheels, and I should put in from 65 to 75 per cent. at the least. And I am satisfied that in every instance sharp flanges could be obviated, if it were possible to keep the other parts of the truck in proper condition.

I can see no perceptible difference in the cost of repairs in the two types of trucks, each doing the same service. I think it costs quite as much to keep up a rigid truck as a swing centre truck, and I am fully convinced that the cost of repairs of the body carried by rigid trucks is heavier than one carried by swing motion trucks.

I would like to digress from car trucks and the ordinary 33-in. wheels, of which so many are used, and call the attention of the master mechanics to the difference in the wear of flanges of the tires of their driving wheels on their engines, those having large and those having small sized driving wheels; and I can safely say that there are ten flanges on small sized drivers cut to one on large sized drivers, and the difference is not always on six or eight wheel driver engines, but often on four-wheel engines, and the same rule to my mind holds good regarding the large and small wheels under cars, that the chances of flange wear are lessened directly in proportion to the increased distance from rail to centre of axle. Were our railroads perfect planes, we would then be able to carry the centre of our boilers to almost any height, and there would be less lateral wear upon boxes than there now is, and we would lessen the danger of an engine turning over and lessen the strain upon the flanges of the wheels. Our master mechanics will agree with me that by changing the centre of gravity from a point midway between wheels to a point directly over the rail, as would be the case on curves, we would have practically no limit as to the height we could

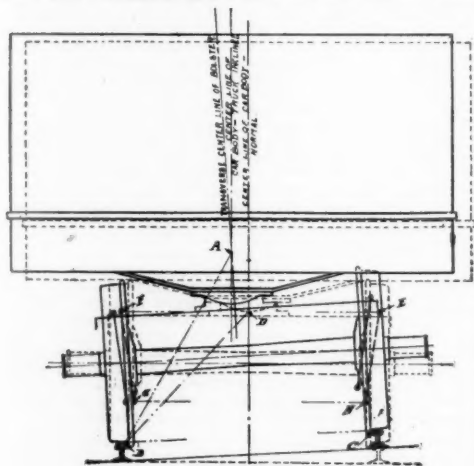


Fig. 1.

make the centres of boilers. It is simply the principle developed in the bicycle of to-day, and it is this principle that should be borne in mind in constructing not only locomotive work, but freight or passenger car trucks.

I do not believe that any trucks should have more than 1 in. to 1 1/4 in. lateral swing each way from the centre, neither should they have any more play between bolsters and swing beams than is absolutely necessary.

There is one other point I would like to mention as having considerable bearing on the point at issue, namely, the side bearings of freight cars. The more I look into the matter the more I am convinced, with all due deference to the opinions and decisions of our Master Car Builders in giving us a standard distance between side bearings, that the distance is too great, and could with very beneficial results be shortened considerably and with appreciable advantage regarding the strain on wheels and journal bearings.

One great cause of flange wear is the imperfect manner of construction and imperfect working of side bearings. Oftentimes they are carrying the load which should be carried by the centre castings and prevent the truck curving as it should.

In conclusion I would say, that during the past year we have averaged in removals less than one wheel for each passenger and freight car and tender on the entire system, which I consider a remarkably good showing.

The President: Should not that last paragraph read "removal for flange wear?"

Mr. DURRELL: No, sir; the removals were for all causes. I might put that in a different form and say that the average number of wheels that we made and used during the past year was less than one for each passenger car, freight car and tender, not only for repairs but for new work that we constructed.

Mr. FORSYTH: Do you remember, Mr. President, what the average per cent. of removals is for cast-iron wheels as ordinarily made?

President BARR: I think the figures throughout the country will show over 10 per cent.

Mr. FORSYTH: According to the figures as I understand them from that letter, it seems that they were only about two per cent. Do you remember (addressing Mr. Durrell) what the figures were for sharp flanged wheels?

Mr. DURRELL: We took out during the first six months of the present year at the Chicago yards 632 wheels. Eleven of those wheels were taken out because of sharp flanges.

Mr. FORSYTH: That, Mr. President, would be less than two per cent., and I for one must say that I feel rather doubtful about the figures.

Mr. HICKEY: I saw a statement a short time ago to this effect: that the number of wheels removed for sharp flanges on three or four of the chief roads of the country was 12 per cent. or 12 1/2, which I think is about the average throughout the country, and is our average, I think.

Mr. DURRELL: Mr. Forsyth will bear in mind that these wheels were removed at only one point, that is, the Chicago Passenger Station, which is the principal point we have on the system. That was the actual number of wheels removed during those six months, and the actual number removed for sharp flanges, under passenger service.

President BARR: Have you any idea how many of those wheels were removed on account of sliding?

Mr. DURRELL: I could not say exactly, but we have the figures and the reason for the removal of every

wheel. At any rate, out of the number there were but 11 that were removed on account of sharp flanges.

[Mr. Durrell subsequently furnished the secretary with the following detailed statement of removals.]

Statement of wheels removed at Chicago Passenger Station, Illinois Central Railroad, for first six months of year 1890, and causes for removals:

Crumbled tread.....	68	No good for further service.
Flat from brakes.....	201	"
Worn out.....	175	"
Good—"Cut out or burnt journals".....	7	Good
Partly worn.....	159	"
Worn out and crumbled.....	2	No good
Sharp flange.....	11	"
Soft chill.....	1	"
Chipped tread.....	3	"
Chipped flange.....	1	"
Loose wheel.....	2	Good
Not stated.....	2	"
Total.....	632	

Mr. BARR: The matter seems to be drifting a little into flange wear of wheels, and, apparently, we learn by inference that the condition of the truck has almost everything to do with that wear. Now, I am very decidedly of the opinion that that is very far from the correct position. In steel-tired wheels our records show that nearly 50 per cent. are removed on account of worn flanges, and that 50 per cent. is made up of the wheels on one end of the axle; on the other end of the axle the wheels are worn hollow on the tread away from the flange. Now, if the truck has everything to do with this we must have a terrible bad lot of trucks on our road! I do not think that is the case, and I am satisfied that if you will look into the matter you will find that nearly 50 per cent. of your steel-tired wheels have been removed on account of one wheel having a bad flange, while the other flange was almost as good as the day it went out of the shop. Again, you go to the yard before the wheels are removed from the axles, and I will venture to say you will find 35 per cent. of the wheels with worn flanges, and each worn wheel with a mate wheel with a flange in perfectly good condition. The question comes up, Have those worn flanges been caused by the truck? If the truck runs to one side it may have been so, but my understanding of the position taken to-day is that the trucks are not properly adapted to meet the curves, and that the wear occurs on both wheels as the car moves over the track, so that you are wearing both flanges. Now, I say boldly here that you will not find one pair out of a hundred with both wheels worn badly enough to remove the wheels. As the result of a good many investigations I would say that it is my opinion that four-fifths of the flange wear is caused either by difference in size of the wheels or by difference in the wearing quality of the wheels. I am positive that that is true in the case of steel-tired wheels, and am almost positive that it is true in the case of cast iron. And I am also almost positive that one-fifth of the wear is due to the trucks. You will notice that I am taking a radically different position from Mr. Durrell, but at the same time I believe that the relative flange wear is going to determine the relative position of the swing beam and the rigid truck.

Mr. D. L. BARNES: It is quite true that while cars which vary in length are passing curves there is a difference in the lateral displacement of the ends of the couplers. This difference in displacement shows itself by one being offset from the other. To accommodate this offset, there is a space between the drawbar and the strap of about 3/4 of an inch, and there is also play at the ends of the journals of the axles, making a total of about 1 1/2 in. Now as it often happens that there is a difference of 4 in. in the offset, it seems to me that before the swing beam truck is discarded this point should be considered. I know of cases in which the backs of tenders and the fronts of baggage cars have been connected by automatic couplers and the baggage car has lifted the tender off the track simply because the short wheel base and the short overhang of the coupler beyond the truck on the tender did not give enough offset to enable the coupler on the tender to follow the coupler on the baggage car in passing a curve. I venture this statement, that the short cars used in this vicinity cannot be coupled to our long furniture cars, and when coupled be pulled around some of the sharp curves in the yards in this city without causing derailment or breaking the drawbar stirrup provided both cars are equipped with rigid centre trucks.

#### Wrecking Outfits and Handling Wrecks.\*

BY P. W. HYNES, WRECKING FOREMAN, B. & N. R. R.

##### I.—INTRODUCTORY.

When we consider the rapid strides which have been made of late years in nearly all the departments of railroad equipment it is astonishing to find so little improvement in apparatus and methods of the wreck gang. In the "early days of railroading" when engines and cars were of very light pattern, when speed was not thought of and time was as plentiful as eternity, the indiscriminate collection of blocks, ropes, tools, jacks, etc., heaped together in a worn out box car answered well enough for clearing a track—it was quicker than to leave it to decay. But to-day, when a blockade is a serious matter, involving heavy losses and great inconvenience, when all kinds of equipment are so much heavier, it is unaccountable that so little advance has been made in the wrecking outfits. As a rule they are just as they were 25 years ago—a few jacks of various sizes, a variety of ropes and chains, several pairs of heavy blocks, an assortment of tools and a quantity of cumbersome blocking. A few roads have adopted portable steam derricks, but I doubt if the results from their use can warrant the cost. I am convinced that there is nothing in the wrecking line which can be accomplished by the use of a portable steam derrick which cannot be as easily and often as quickly done by the use of suitable tackles; and in some cases tackles skillfully rigged and used can do what any portable steam derrick on a railroad cannot.

For many years I have made a point of seeing any wrecking car which happened to be near at hand, and I almost always find the appliances to be of inferior de-

sign, lacking in uniformity and far too heavy—some of the blocks would make a load for four men. I have sometimes found long oak planks shod on each side with half inch iron—10 men would stagger under the weight.

Too little attention is given on most roads to the employment of an experienced man of good judgment to take charge of the wreck gang. A few years ago I stood for an entire day watching the efforts of a wrecking crew which was trying to replace a derailed engine on the track. The engine, which weighed about 35 tons, had run off at a stub switch and leaned over badly. The tender was disconnected and pulled on the track. There were six attempts made to straighten up that engine, with a tackle composed of a rope 2 in. diameter and two very heavy double blocks, one of which was made fast to the dome. The first three attempts were made with a switch engine pulling and the three later attempts were made with two engines coupled together, and at last two hydraulic jacks had to be placed under the low side before the engine could be straightened up. With the appliances in the ordinary outfit this job should have been done in less than two hours.

I took the pains to figure out the maximum power which could be developed from the apparatus by which the work was finally accomplished and found that they had wasted at least 75 per cent. of it. It is a question of apparatus as well as method, and after careful study of the subject my opinion is that, excepting coils of rope, chains and hydraulic jacks, there should be nothing in a wrecking car which an ordinary man could not easily carry. That this statement will be condemned by some I know; but I propose to prove its truth in the chapters which follow. The plan which I wish to advocate is the use of blocks specially designed for the work, ropes and other apparatus light enough to be easily and quickly handled and systematic methods applied with accuracy and rapidity. I have practiced what I preach and I know the doctrine to be sound.

##### II.—BLOCKS.

Fifty years ago the various forms of blocks now in common use were quite unknown. While we make use of cast and wrought iron, brass, steel and wood, separately and in combination, our predecessors depended almost entirely upon wood, and all blocks at that time were either "mortised" or "built." The "mortised" block was made from a single piece of sound, well-seasoned hard wood, in which the recesses for the sheaves were cut or mortised. The "built" block was made of slabs cut to the proper size and separated by chocks somewhat thicker than the sheaves, the whole being fastened together by iron pins passing through sides and chocks and riveted at the ends in the same manner as at present. Both "mortised" and "built" blocks would then be bored for the centre pin and the sheaves, usually of lignum-vitæ, put in place. The block, being properly scored, would next receive the strop, which was always of rope, and of such a size that two parts would equal in strength the total strength of all the ropes rove in the block. The strop was passed round the thimble in the eye of the hook and the ends spliced at the back end of the block so as to leave a little slack between the thimble and the block. A good strain was then put upon the hook so as to settle the strop into the score. Next ease off the strain, draw the two parts of the strop together between the thimble and the block, pass a "seizing" tightly round the strop where the two parts meet and the block is complete. Heavy blocks were stropped with smaller rope doubled so as to divide the strain between four parts.

The first improvement on this method was the use of external iron binding in place of the rope strop. This soon gave place to the internal iron binding which is used exclusively in wooden blocks of to-day.

It is of the first importance that the use for which a block is intended should be carefully considered in the design. Thus, if two pairs of blocks are required, of equal strength and of the same class, one to be used on a derrick and the other in a tool car, it would be better to construct each pair for the special work it is to do than to buy all of the same pattern. For the derrick, the lower block should be heavy, so as to assist to overhaul the tackle; it should be short, so as to give as high a hoist as possible, and it should be fitted with a short, powerful swivel-hook. For the tool car, the blocks should be as light as possible, consistent with the required strength, as they must be carried about. Also they should have in place of hooks shackles which can be made of greater strength and less weight.

The sheave of a block when in use acts as a lever of the second order, the fulcrum being at one end of the diameter, the moving power at the other end and the load being at the centre of the sheave.

The following general laws will apply to the proportions of all ordinary blocks up to 16 in. for ropes of 2 in. or less in diameter. The length of shell equals eight diameters of rope, the breadth of shell being two-thirds the length. The diameter of sheave at bottom of the score is four times that of the rope. The thickness of sheave equals the diameter of the rope plus 3/4 in. for all sizes of rope under 1 in., 1/4 in. for sizes under 1 1/2 in., and 3/8 in. for sizes under 2 in. The diameter of pin equals one-half that of the rope. The sides of the shell are as thick as the diameter of rope. The thickness of iron strops or internal binding is usually one-fourth the diameter of rope, or 1/4 in. for 8-in. block, 3/8 in. for 12-in. block,

\*Copyright 1890, by P. W. Hynes.



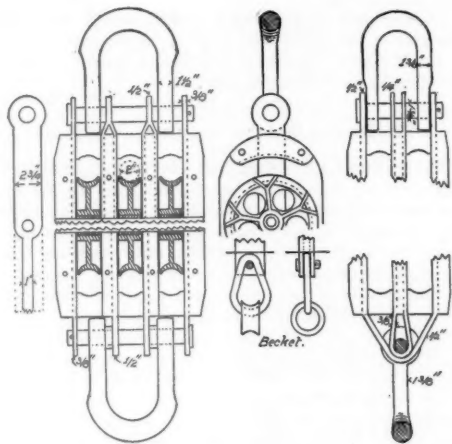


Fig. 1.

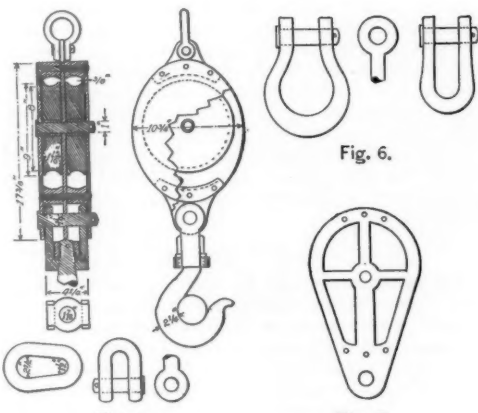


Fig. 2.

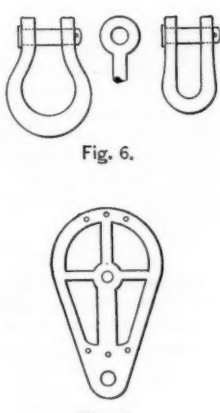


Fig. 3.



Fig. 4.

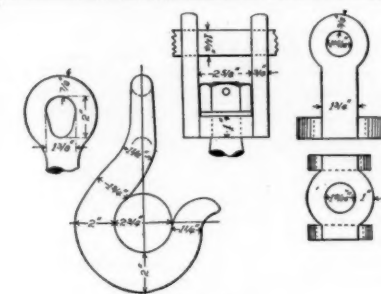


Fig. 5.

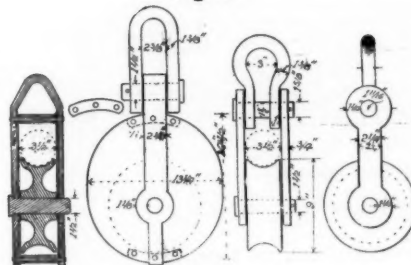


Fig. 6.

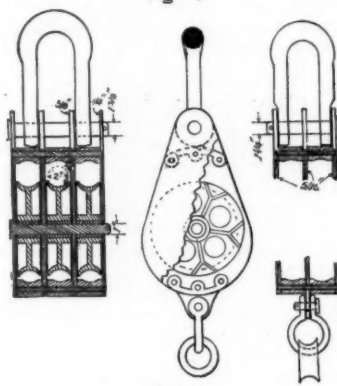


Fig. 7.

## BLOCKS FOR WRECKING OUTFITS.

and  $\frac{1}{4}$  in. for 16-in. block. This rule will often hold good for larger sizes.

Many persons prefer wooden blocks to iron ones, and for certain classes of work they are undoubtedly better adapted. In fig. 1 are given plans for the construction of powerful purchase blocks, both double and treble, with two methods of iron binding for each.

A becket to which to make fast the standing part of the rope is to be fitted to the double block by allowing the ends of the centre strops to project from the back end of the block about  $2\frac{1}{4}$  in. The pins are to be of tool steel and the sheaves steel bushed. Care should be taken to use only the best of material in the construction of the iron strops and their total strength must not fall below that of all the parts of the rope rove in the block. Of course the weakest point will be at the centre where the pin holes reduce the sectional area.

Iron strops for wooden blocks are usually made in the form of the letter U, and for double blocks they are made in two pieces, the bottom parts being so forged as to fit each other as well as the eye of the hook. This plan is not to be recommended for blocks with more than two sheaves. There can always be found about the boiler shop scraps of boiler plate which will make excellent strops when planed up and at a cost much less than that of forged strops. The strops should always extend to the back end of the block, the ends entering recesses between the chocks and the sides or partitions so as to keep the strops in the recesses cut for them in the sides and partitions.

It is customary to have the end of the centre pin bent at right angles so as to fit into a slot in the side of the wooden shell to keep the pin from turning. The pin is secured in place by a piece of galvanized iron tacked over the slot.

I have often seen in use on derricks large, heavy iron blocks which, having the appearance of great strength, yet were so defective in design as to fall far short of what would be expected. The defect most frequently noted is a want of support to the centre pin between the sheaves. Unless this support is provided, the centre pin will bend under a less strain than would be required to break any other part of the tackle. This could of course be avoided by making the pin large enough, but that would diminish the power of the block. The proper remedy is to have sides and partitions of the same size as regards length and breadth, so that the bolts or rivets holding the block together would pass through and bind them all firmly in shape. This would support the centre pin on each side of every sheave and increase the strength and life of the block. As the pin does not turn the friction is not thereby increased. A heavy strop on the outside of a block always suggests to me weakness on the inside.

As a rule, the iron blocks are more satisfactory for use

on derricks, and any railroad repair shop will furnish ample facilities for their construction. Some time ago I had made under my direction a pair of iron derrick blocks to replace a pair of wooden ones which were found to be defective. It was decided that they should be short, double, and compact—the upper one to be fitted with a shackle and the lower one to have a becket and short, powerful swivel hook. The lower block should be heavy enough to overhaul itself, and both should stand a lift of 15 tons. I determined to build both blocks of iron on the plan shown in fig. 2. The sides were made of boiler iron, as were also the centre partitions, all being cut to the same template, and a projection being left on one of the centre partitions at one end to take the becket. The chocks being cast and planed to size; the blocks were fitted together and secured by clamps. Then three holes were drilled through sides and chocks at each end and countersunk on the outside, after which the rivets were closed hot and trimmed off even with the sides. The blocks were then drilled for the 1-in. centre pins and for the shackle and swivel hook. The sheaves for the lower block were cast solid so as to make the weight as great as possible. They were 9 in. outside diameter and nearly  $1\frac{1}{4}$  in. thick. After being carefully squared the holes and scores were turned up in a lathe. The hook was made of  $2\frac{1}{4}$ -in. round iron, bent to a circle  $2\frac{1}{4}$  in. in diameter, and the shank drawn till just enough stuff was left to turn the neck of the hook for the swivel to  $1\frac{1}{2}$  in. diameter, and long enough to pass through the swivel and take a nut and a  $\frac{1}{4}$ -in. brass friction washer. The neck of the hook was cut with eight threads to an inch so as to leave plenty of metal to take the strain. A  $\frac{1}{4}$ -in. brass pin was then passed through both nut and neck and clinched at both ends to lock the nut. When finished both blocks appeared alike except for the stout swivel hook and becket on the lower one and the shackle on the upper one. There was also a self-lubricator added to each block which carried a supply of oil for six months. I have used these blocks for three years, with perfect satisfaction, with rope of  $1\frac{1}{2}$  in. diameter.

Blocks for heavy work are usually made too light. They should always be the strongest part of the tackle, yet experience proves that when a break occurs it is generally in some part of the block, and oftentimes the hook. Hooks are of two kinds, plain and swivel, and each of these is made in two ways—round or flat on the sides so as to give a deeper section. Where the hook couples to a chain or link the flat hook is better, because it can be given greater strength; but it is often desired to use a lashing or rope instead of chain, because of the danger of flaw in the metal, and when this is done the round hook should be used, as it will not cut the rope. As to the use of plain or swivel hooks, is mainly a question of convenience depending upon

the nature of the work. But for heavy work I recommend the use of shackles. Fig. 3 shows a good plan for the construction of both plain and swivel hooks.

In fig. 6 I have given plans for curved and straight shackles. The straight one is the strongest, but sometimes more space is required to receive the lashing, and then the curved form is better. As regards the proper size for a shackle which is to take hold of a lashing, it is safe to make the area of opening clear of the strop ends about 25 per cent. greater than the total sectional area of the rope rove in the block. The hook should be proportioned to the tackle, a simple and safe rule being to make the curve of the hook, with its inside diameter, equal to from  $1\frac{1}{2}$  to 2 diameters of the rope. The greatest sectional area of the hook should be about one-third of the total sectional area of all the ropes rove in the block.

Care should always be taken so that the strain shall be applied in the centre of the hook or shackle, and thence evenly distributed to all parts of the block. No hook or shackle should be so mounted as to be liable to get out of line with the centre of the block. This can be avoided by the use of thimbles made of gas pipe.

Great power can be developed by use of the "gin" block" when skillfully handled. Fig. 4 shows plans of one which I can recommend.

Fig. 5 shows plans and sections of a very light and powerful pair of steel purchase blocks with shackles. The design is suitable for any size of block, and they can be constructed in any ordinary railroad repair shop.

Fig. 7 will indicate a method of cutting away the sides of an iron or steel block without impairing its strength.

Various metals are used in bushing sheaves for blocks, but I do not wish to discuss them here. I will say, however, that steel bushings with steel pins well fitted and lubricated will give excellent results. The steel in pins should not be too hard. Too much attention cannot be given to the proper care of the blocks. Whenever they have been subjected to a severe strain they should be taken apart and carefully examined for any signs of weakness. The pins and sheaves should then be cleaned and oiled before replacing, using good oil and plumbago. I have several times found defects such as bent pins, strops cracked, sheaves chipped or cracked, which, if not detected, might have caused serious trouble.

## Draft Rigging—Western Railway Club.

At the November meeting of the Club Mr. C. A. Schroyer (C. & N. W.) read the following paper:

Probably 50 per cent. of the cost of maintaining freight car equipment to-day, not including wheels or axles, is in the draft rigging.

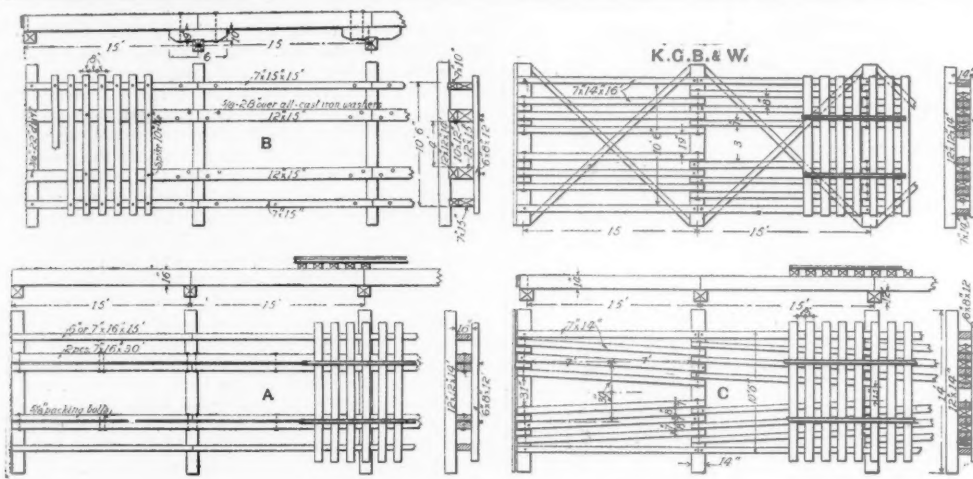
It is well known that the tractive power of road and switching engines has very greatly increased, and is probably double what it was 10 or 12 years ago on many roads. More cars are being handled per train and the severity of service in switching yards is very greatly increased as a result of these conditions, while but little increase has been made in the power of the draft rigging to absorb the violent blows necessarily received. These blows are taken on a line from 4 to 6 ins. below the sill line of the car, and in such a manner that the tendency is to break the sills downward over the bolsters, or upward over the cross centre ties near the centre of the car. These conditions are almost universal in this country.

While the question of a buffer does not enter directly into the subject under discussion, it is one which should necessarily be considered, more especially so as it is very materially complicated by the adoption of the Master Car Builders' type of bar, in which the buffer cannot be operative when the knuckles are open and the coupling is made, and when the knuckles are closed and it is not intended that the coupling should be made. I believe a great mistake has been made in freight car construction whereby that part intended to pull the car must receive these violent blows. There are a number of special devices on the market which aim at increasing the strength of these parts. I know of only three of these special devices which make any effort at increasing the power to absorb the blow by cushioning, which, to my mind, is the vital point. Of these three, one aims to do its work by springs alone, whereby the same tensile resistance is offered that is had in the buffing resistance. This, to my mind, is a mistake, for the reason that in the use of an M. C. B. tight coupler the rigging is too rigid and the engine cannot exert its tractive power as effectively as if greater elasticity was had in the tensile resistance, remembering that as a measure of safety we are limited in the forward movement of the bar. Another special device is aided in absorbing the blows by the use of friction plates, which are operative both in the backward and forward movement of the bar. Another device aims at increasing the buffing resistance without any increase whatever in the tensile resistance. The majority, however, confine themselves to increasing the strength in the other parts of the draft construction, and the vital point, the absorbing of the blow, is entirely ignored by many except where they figure that the body of the car itself is capable of absorbing a greater or less amount. This capacity of the car itself to absorb blows depends largely on whether a continuous timber is used underneath the sill of the car and whether the stops are so framed that a very rigid bearing is had on these timbers, and also upon the casting of a lug on the top of the bar which in its backward movement comes in contact with the end sill, with all of which conditions there is yet more or less destruction when the blow received is greater than the cushioning capacity of the springs used.

It is the universal practice in our country to use a coil steel spring in absorbing these blows, and we are limited in the strength of any coil spring which can be used, as follows: In the length of the spring; by the need of preventing an increase in the movement; in the diameter of the spring, by the size of the opening and the diameter of the bar, and in the pitch of the spring by the torsion strains on the bar. Hence, in a spring  $6 \times 8$  in. in size from 20,000 to 22,000 lbs., and in a spring  $6 \times 7$  in. from 18,000 to 20,000, is the maximum strength from which good service can be expected when the springs are made of the best crucible steel.

I have made some tests to determine the measure of a blow struck by a car of a given weight, with a spring





FLOOR SYSTEMS OF TREESTLE BRIDGES.

MILWAUKEE &amp; NORTHERN RAILROAD.

used of a capacity equal in strength to the weight of the car, and the latter moving at given rates of speed, with the following results:

A car weighing 22,000 lbs. fitted up with an M. C. B. type of drawbar, the spring having 22,000 lbs. ultimate strength and put up in the draft rigging so that all parts of it came snug and there was no undue strain on the spring when in a normal condition, was brought in contact with a car of equal weight, the draft rigging of which was blocked solid. Under a speed of one mile per hour the drawbar had a backward movement of  $1\frac{1}{2}$  in., which measured a blow of 15,000 lbs. Under a speed of three miles per hour it had a backward movement of  $1\frac{3}{4}$  in., which measured 19,000 lbs. resistance. Under a speed of  $3\frac{1}{2}$  miles per hour it had a backward movement of  $1\frac{1}{2}$  in., which registered 22,000 lbs. resistance,  $1\frac{1}{2}$  in. being the limit of movement of the spring. Under a speed of four miles per hour the backward movement was  $1\frac{3}{4}$  in., which was  $\frac{1}{8}$  of an inch more than the ultimate movement of the spring, indicating that some portion of the draft gear itself had given sufficiently to make this difference.

Thus it will be seen that a car having a spring the resistance of which is equal to the weight of the car will withstand a blow given at a rate of speed of  $3\frac{1}{2}$  miles per hour; all over this speed resulting in a rigid blow.

I have observed in testing a coil spring under steam hammers that we could strike a blow sufficiently hard to exhaust it, and a large number of these blows would be received by the spring without any perceptible difference. But where the blow received was equal to two or three times the resisting power of the spring it was in all cases very destructive; and the point arises here, in many of the draft riggings which aim slowly at strength in the parts without increasing the cushioning capacity, whether the damage that is now done to other parts of the rigging will not be transferred to the spring and result in the destruction of it.

In a test that I made where the weights of the cars were unequal, I found the following results: A car weighing 22,000 lbs., the spring of which had a resisting power of this amount, was brought in contact with a car 33,000 lbs. in weight; the spring exhausted, in its backward movement, under a blow equal to a speed of one mile per hour, while in the car weighing 33,000 lbs. the ultimate strength of the springs in which was 39,000 lbs., the bar had a backward movement of  $1\frac{1}{8}$  in., which registered a resistance of 21,500 lbs., and a speed of four miles per hour was necessary to exhaust the strength of these springs.

While the tests that I have made have only been to determine approximately the blow required to do this work, it will be seen that a spring is only able to resist a body equal to its own strength moving at a rate of  $3\frac{1}{2}$  miles per hour, and if the weight of the body to any great extent exceeds the resisting power of the spring, it will only withstand a blow of one mile per hour.

Hence the conclusions that I would draw from these tests would be as follows: That in all draft riggings constructed the power to absorb the blow received should be confined to some elastic construction in the draft rigging, rather than any portion of the construction which is intended to be rigid with the car body.

#### Wooden Trestle Bridges.

BY WOLCOTT C. FOSTER.

#### FLOOR SYSTEMS ON THE MILWAUKEE & NORTHERN RAILROAD.

In the *Railroad Gazette* of July 18, 1890, the plans for double and triple deck trestles on the Milwaukee & Northern Railroad were given. We have since received some further plans of floors now in use on that road from Mr. S. B. Fisher, the Chief Engineer.

System A (adopted June, 1880) Mr. Fisher believes to be the best plan. In former years the long timbers required by this construction could be easily and cheaply obtained.

System B (adopted June, 1881) has been used on extensions in the woods. The track stringers of 12 in. x 15 in. cross section are hewed from sound picked timber. This system is due to the late Mr. Cravath, formerly Chief Engineer of the road, and has answered its purpose to the satisfaction of the operating department.

System C (adopted June, 1890) is new and is being used to replace bridges which are worn out, principally those of system B. It is in the nature of an experiment and Mr. Fisher says that they may find it better to butt and pack the stringers over the caps.

A fourth system is also shown. It is the standard adopted in July, 1890, for the Kewaunee, Green Bay &

Western Railroad, an allied part of the M. & N. system. It has been designed for the purpose of making use of hemlock timber, the only kind of timber available along the line of that road. It will be noticed that this system is very similar to system C.

#### Swivel Truck for Street Cars.

The truck which we illustrate in this issue was built by the Taunton Locomotive Manufacturing Co. for the West End Street Railway, of Boston, from designs by F. W. Dean. The West End Company has adopted long double-truck cars since the introduction of the electric system, with much comfort to its patrons and satisfaction to itself. Even on a poor track these cars are free from the vertical vibration which is inseparable from the short car on any but the most perfect track, and so uncomfortable to the occupants. The double-truck car is likely, with the introduction of electricity, to displace the four-wheel car in all of our cities.

The truck in question, of which 30 have been delivered, is interesting as being an example of a plate frame such as might be seen on the other side of the ocean, and it shows how neatly such a design works out. The conditions to be fulfilled were somewhat exacting. The design was made for open cars with a long step or running board on each side, and it was important that on curves of 31 ft. radius no part of the truck should strike this running board, much less necessitate cutting the board away. By adopting the plate frame was made so thin that no part of it touches the board before the tread of the wheel interferes, and thus no more could be accomplished, even by an inside frame. The extreme ends of the frame are so low that, on curves, they pass under the running boards, as do also the boxes. The wheel base is 4 ft. 6 in., and the wheels 30 in. in diameter.

The trucks were adapted to receive Thomson-Houston motors. The simplicity of the construction is evident. The frames are connected across the centre by a cast iron girder which rests on the plates and is further secured by a number of ream bolts. The springs are secured to U-bolts passing over the boxes, which are of the Bemis patent, and their upper ends press against recesses formed in the binders of the housings. By unscrewing the nuts at the bottom the springs, binders and axles can drop out clear of everything.

The brake gear is simple, direct, powerful and comfortable to operate. The blocks are applied to all wheels

and to their inner sides. This position reduces the disturbance of the blocks, from the teetering of the truck, to a minimum.

The car rests upon a centre casting which swivels on the girder, the whole being held together by a king-bolt. The side bearings are depressed rollers, immersed in oil and protected from dust.

#### The Barnes Water Purger on the Wabash.

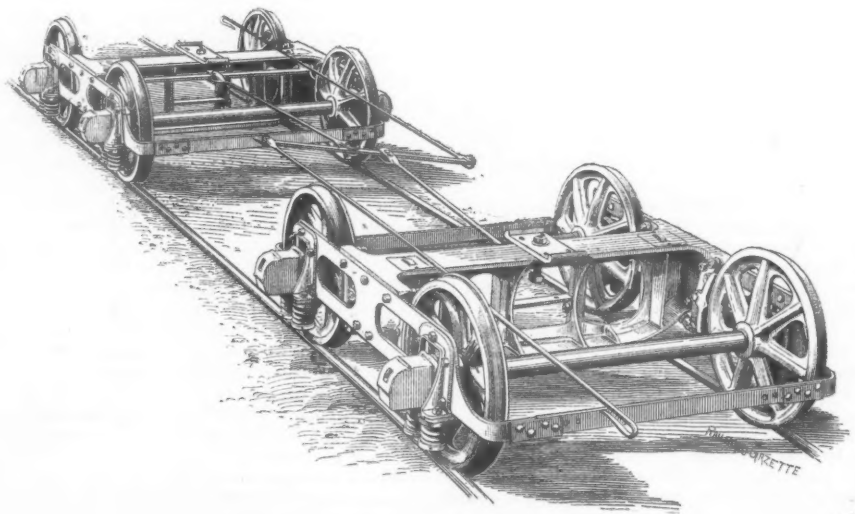
The feed-water purifiers in use on the Wabash Railroad appear to be doing good work, and from all accounts are most successful and satisfactory in their operation, preventing scale, and lengthening the period an engine can be safely run without washing out. Any one familiar with the character of the water used by locomotives in that section of the country will appreciate the statement that, with the Barnes device [see *Railroad Gazette*, July 25, 1890], engines are being regularly run 10,000 miles without washing out, the momentary opening of the blow-off cock under the waist of the boiler, six or eight times a day, disposing of the sediment which is precipitated in the space between the shell and the inside liner. A small quantity of mud finds its way into the water spaces in the fire-box legs, but is taken care of by two blow-off cocks.

Mr. J. B. Barnes, Superintendent Motive Power, is applying the purifier to engines that go into the shop for general repairs, and so far has met with nothing but success. An engine equipped with it necessarily steams more freely than others of the same class, on account of the freedom from scale of the heating surfaces of flues and fire box; and as hurried washing out cannot fail to injure the fire box, it follows that a material increase in the life of fire boxes will result from the use of Mr. Barnes' device; flues will also last longer, and the charges for boiler-makers' labor, which form so large a percentage of the cost of engine repairs, will be considerably reduced. C. B.

#### A North River Bridge.

At a meeting held last Monday the New York and New Jersey Bridge Commissioners decided upon the location of a bridge across the North River and to the terminals and connections. The Commissioners are Andrew H. Green, Evan Thomas, Isador Strauss, C. M. Vail and F. K. Hain, all of whom were present at the meeting. The engineers, T. C. Clarke and C. B. Brush, submitted a report with plans. The location as adopted is as follows: The bridge begins in New Jersey at a point opposite the prolongation of the lines between Seventieth and Seventy-first streets, New York City, which is above Weehawken. The bridge on the New York side will extend between Seventieth and Seventy-first streets to near Eleventh avenue. The viaduct then curves to the south and runs on a line about 100 ft. west of Eleventh avenue to near Thirty-eighth street. It then curves to the east and runs between Thirty-eighth and Thirty-ninth streets to a union station, which will cover the blocks between Thirty-seventh and Thirty-ninth streets, Eighth avenue and Broadway.

One approach will extend from this union station to a connection with the Manhattan elevated at or about Sixth avenue and Thirty-third street. Another double track approach will run northerly, cross the New York Central & Hudson River tracks over grade somewhere above Sixtieth street, and come to the surface, at about 8 ft. above mean high water, near Seventy-ninth street. Then it will run along the river front outside the New York Central tracks on a made bed of piles or filling. Near 155th street it will cross the New York Central tracks again, overhead, cross the Manhattan elevated also overhead, and the Harlem River to a connection with the New York Central and New York & Northern nearly opposite 162d street, prolonged. Connections will also be made with the New York, New Haven & Hart-



SWIVEL TRUCK FOR STREET CARS.

Designed by Mr. F. W. DEAN. Made by the TAUNTON LOCOMOTIVE MANUFACTURING CO.



ford and other roads beyond the Harlem River. On the New Jersey side the line will be carried through the hill, and diverging lines will go northerly and southerly to connect with all the roads coming in on that side of the river. The bridge and viaduct will carry six tracks; two passenger, two freight and two rapid transit tracks. The station will be 280 ft. wide by 1,300 ft. long, with room for 20 tracks.

It is proposed to run a branch on the west side of the river along the top of the hill for several miles to the northward. The high level will allow grain and coal cars to run above a line of grain warehouses and coal trestles placed at the water's edge.

#### An Air Brake Piston Travel Indicator.

The engraving herewith shows the Schroyer-Thompson, air brake piston, travel indicator. This was illustrated in the *Railroad Gazette* Jan. 17, 1890, from working drawings. We venture to call attention to the device again, as it is one the value of which is not generally understood.

The usual method of ascertaining the travel of the piston is to apply the brake while the inspector gets under the car and measures the travel. This is a slow process, and the liability to error is considerable. The measurement must be made whether the travel of the piston needs adjustment or not, and continual measurement is therefore necessary to ascertain this, and to keep the travel within the proper limits. Error is liable to occur through the haste often necessary on account of the adjustment being made at initial and terminal points and at the time when a train is about to start. By this device the travel of the piston can be accurately determined and automatically indicated, and it can be seen by the inspector at a glance without requiring a brake application or the measurement by him of the travel of the piston in each instance. Such an assistance to an inspector must considerably further the maintenance of a thoroughly efficient brake equipment by keeping the proper travel of the air piston.

The indicator for passenger service consists of a stuffing box screwed into the blank cylinder head, and containing a graduated bar, sliding under friction, to prevent a shock to the car from affecting it. The graduated bar is moved by the piston in one direction only, and being held by the friction of a small spring, accurately records the greatest travel of the piston. This travel is indicated in inches on the graduated bar, in full sight of the inspector and car repairer.

The indicator for freight service differs only in its application to the brake cylinder. It is bolted to the cylinder by one of the cylinder-head bolts, and the bar is passed through a small hole drilled in the cylinder head. After each adjustment of the piston travel, the indicator is pushed back so that it indicates no travel.

This apparatus as well as the Potts Air Brake Register (described by us Oct. 5, 1888) is sold by the Western Railway Appliance Company, Chicago, Ill.

#### The Counselman Case.

The investigation of alleged violations of the Interstate Commerce law now being conducted at Chicago before the Federal Grand Jury promises to be of more than usual importance, as it has developed a test case under the law.

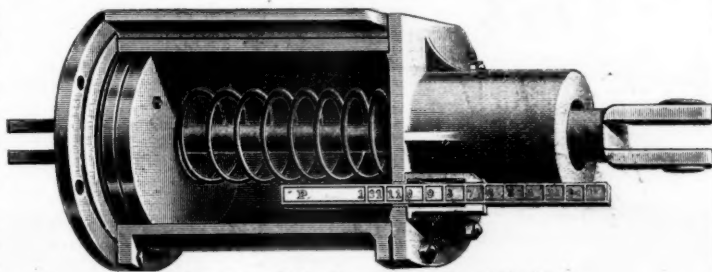
Among the witnesses under examination is Charles Counselman, senior member of the grain commission firm of Counselman & Co., of Chicago. When Mr. Counselman was asked if he had obtained any rate for the transportation of grain from points outside the state on any of the roads coming to Chicago less than the open rate, or if he knew of any such rebates being given, he declined to testify on the ground that such testimony would tend to criminate him.

His counsel claim that the present investigation by the Grand Jury is without specific charge—"a fishing excursion"—hence without their jurisdiction; that the Interstate Commerce law gives the Commission itself ample power to investigate all alleged violations of the law, and that this investigation should have been made by it first, and not by the Grand Jury; that any state or federal law that compels a witness to testify against himself constitutes an abridgment of constitutional liberty; that the section of the Revised Statutes under which it is claimed that he can be examined, notwithstanding his constitutional protection, does not go far enough to be a substitute for the constitutional privilege; it does not give the witness immunity from prosecution, but merely says that the testimony which he gives shall not be brought up against him. It does not say that he will not be prosecuted for the offense, and it is easy to see that when he is examined and required to testify fully it would involve the disclosure of names, dates and transactions, by means of which it would be easy to make a case against him without using his own

admissions, by simply calling the parties whose names he himself had furnished.

The prosecution contend that as the Interstate Commerce law, and also the General Statutes, provide that criminal testimony shall not be used against the witness in a criminal proceeding, he should be compelled to testify, otherwise the Commission had no power of action; that the Commission was taking the proper course of procedure; that upon the decision of this point rested the success or failure of the Interstate Commerce law, as the only parties of whom the Commission can secure evidence are the shipper and the carrier; if both can refuse to testify, nothing can be done.

After hearing arguments Judge Blodgett, of the District Court, where the case is being tried, delivered an opinion, in which he first referred to the diverse opinions that had been held by different courts. Reference had been made to the case of the Pacific Railway Commission (32 Federal Reporter, 241), in which the Commission attempted to examine Leland Stanford, President of the Central Pacific Railway Co., in which the court held that the Commission was not a judicial body, and possessed under its creative act no judicial powers to determine rights of the government or of the corporation whose affairs it was appointed to investigate, and could not compel testimony or production of papers. Also to the case of *Boyd v. United States* (116 U. S. 616), in which it



Position of the Indicator after release of the brake.

Schroyer-Thompson Air Brake Travel Indicator.

was held that a provision of a law of Congress requiring the compulsory production of papers as a foundation for criminal proceedings was unconstitutional.

Judge Blodgett said he was of the opinion that the preponderance of opinion was in favor of requiring a witness to testify, and proceeded as follows:

"I am of opinion that this witness cannot properly avail himself of the privilege which he has set up in regard to answering the questions propounded to him by the Grand Jury.

"In regard to the point urged by counsel for respondent that this was an investigation by the Grand Jury intended to take in a wide scope without specific charges against any one, I am not sure that this is without the functions of the Grand Jury. They may proceed upon information given them by the District Attorney, or even one of their own number, and it is perfectly competent for them to take cognizance of such information. They were informed that the Interstate Commerce Commission had requested that they be kept together and not dismissed until the Commission should present certain matters of violation of the law.

"The further objection is made that the law clothed the Commission with ample powers to investigate all cases, and that is true according to the letter and tenor of the law itself, but may be doubted since the decision of Chief Justice Field in the Pacific Railway Commission case. I am not aware that this decision has been challenged. Whether the power to send for certain papers and invoke the power of the court to send for witnesses can be exercised by the Interstate Commerce Commission may be a question. If so the Interstate Commission might be embarrassed in their investigations in the same way the Railroad Commissioners were embarrassed. I think there is still a better answer than that to the point made, and that is that the receiving of information by the Commission would not supersede or take the place of an investigation by the Grand Jury. The investigation by the Commission would only be for the purpose of satisfying themselves whether an offense had been committed of such gravity as to require them to present it to the Grand Jury. The Grand Jury would have to cover the same ground.

"It is further stated by counsel that this investigation included a wide field of violations and a large number of people. That is no reason why the Grand Jury should not investigate. The more violations the more need of investigation.

"This court has no right to judge on the policy upon which the Interstate law was enacted. My own opinion is, that inasmuch as whatever Mr. Counselman may say, in answer to the questions propounded by the Grand Jury or any other like questions in the same line, will not and cannot be used against him in any criminal prosecution whatever, that it is his duty to answer the questions, and that he should appear before the Grand Jury this morning and answer the questions and other questions put to him, either by any member of the Grand Jury or the District Attorney or his assistant touching the subject matter of inquiry before them."

Counselman then went before the Grand Jury and again refused to answer the questions, which was reported to the court. He was thereupon fined \$500 and

committed for contempt. Counsel then petitioned Judge Gresham, of the Circuit Court, for a writ of habeas corpus, which was granted, and the case was argued before that court Nov. 28. The entire day was spent in arguing the case before Judge Gresham and substantially the same arguments were made as in the District Court and numerous authorities cited by both sides. Judge Gresham's decision has not yet been given.

#### Reynolds' Improved Baggage Truck.

The Lansing Wheelbarrow Company, of Lansing, Mich., makes an improved baggage truck which is now in use on a number of railroads. In place of the tongues used on the ordinary truck of the old style, there is a rigid handle which allows the truck to be either pushed or pulled and gives the man running it better control over it. The tongues should be dispensed with, if possible, because of the room they require on platforms, and these improved caster trucks appear to move and turn under a load with greater ease than those with tongues.

The main wheels are 24 in. diameter, and the front wheels, which are casters, are 12 in. diameter. The truck can be turned in its own length. Owing to the large diameter of the wheels and the proportion of the load which they bear, one man can handle a loaded truck easily. The weight of the heavy truck is from 170 to 180 lbs. This truck is made in several varieties for special uses.

#### Fastenings for Steel Tires—Western Railway Club.

The paper read by Mr. G. W. Rhodes at the October meeting, on steel tired wheels and their fastenings, was taken up for discussion at the November meeting. The subject was opened by Mr. Rhodes, who presented drawings of various fastenings. In explanation of his drawings Mr. Rhodes said:

In sheet No. 1 each tire is represented as being  $2\frac{1}{2}$  in. thick. We have then taken off what would leave the tire 1 in. thick from its fastenings at the centre to the tread of the wheel, in order to show the effect on the tire when it is nearing its worn out condition. Black shows their sections when worn to 1 in. thick at centre of tread. Assuming that flange wear will condemn the tire, and that at the throat we must have not less than  $\frac{1}{2}$  in. of metal, we obtain with tires of equal original thickness the following tread wear:

Fig. 5	1 1/4 inches.	Fig. 4	1 1/2 inches.
" 5	" 1 1/4	" 3	" 1 1/2
" 6	" 1 1/4	" 2	" 1 1/2

Showing a difference of about  $\frac{1}{8}$  in. between the maximum and the minimum here represented, which in a 42 in. wheel would be equal to about 70 lbs. of metal, or \$1.03@2 1/2¢, \$2.50@4¢, and \$3.50@5¢.

The usual practice with fig. 5 is to make 1 in. the last turning, which brings them to the condemnation point when about  $\frac{1}{8}$  in. is worn off. We therefore are of opinion that 1 in. at the centre of the tread for last turning, and afterward  $\frac{1}{8}$  in. wear, will be as thin as it is practicable to go in a 42 in. tire—and above this if the tread is weakened by the fastening.

In sheet No. 2 we have endeavored to show the appearance of the tire with various fastenings, having received their last turning at 1 in. thick at the centre of the tire, and being worn away  $\frac{1}{8}$  in. Each tire is represented with a sharp flange. The sections represent the following square inches of material:

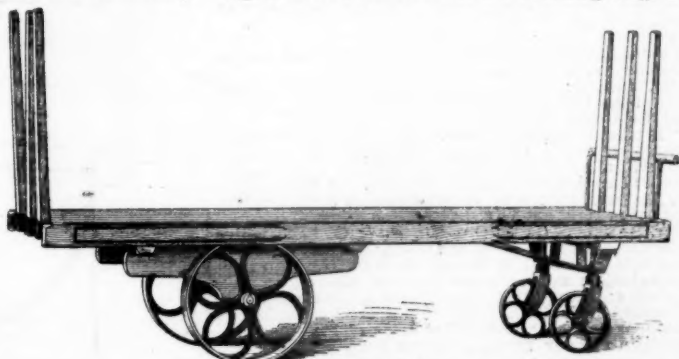
TABLE SHOWING WEIGHTS OF VARIOUS TIRES WHEN WORN OUT.

	Area of section of tire when worn out.	Approximate weight.	Comparative weight, taking fig. 8 as maximum 1.
Fig. 10	sq. in.	lbs.	
" 2	4.66	156	.54
" 6	4.74	158	.54
" 4	5.18	173	.59
" 1	4.79	160	.54 +
" 3	5.93	198	.68
" 8	6.00	200	.68 +
" 9	7.50	247	.80
" 7	7.64	250	.85
" 5	8.84	288	.98
" 8	8.95	290	1.00

In the case, therefore, of fig. 10 we throw away 156 lbs. which at 3¢ a pound has cost \$4.68, and in fig. 8, 293 lbs., which at 3¢ has cost \$8.79.

These figures, however, cannot be regarded as accurate, and are given only to show the various points to be considered in weighing the various merits of tires and their fastenings, for it is evident that if figs. 1, 2 and 10 have only now reached their condemning point, Nos. 7, 8 and perhaps 9 may still have service in them. This morning we heard of the failure of a wheel on our line, secured as per fig. 1. I regret much that we are unable to present a full statement of the case; I understand that a flange broke.

Fig. A shows a section of tire and retaining rings as



Reynolds' Patent Improved Baggage Truck.



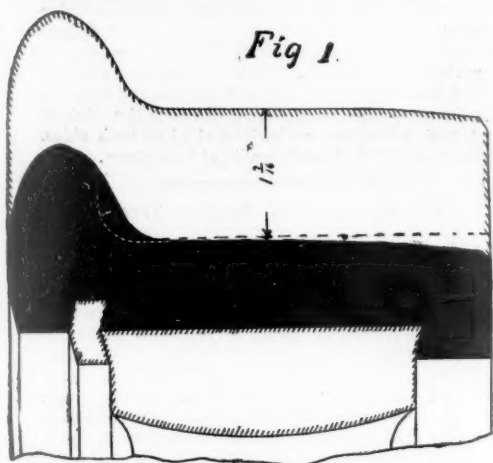


Fig 1.

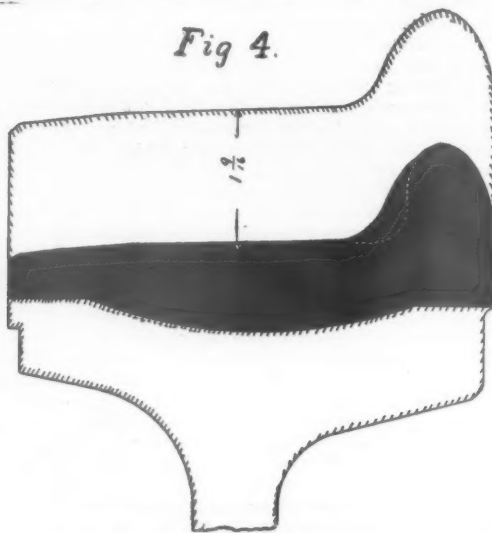


Fig 4.

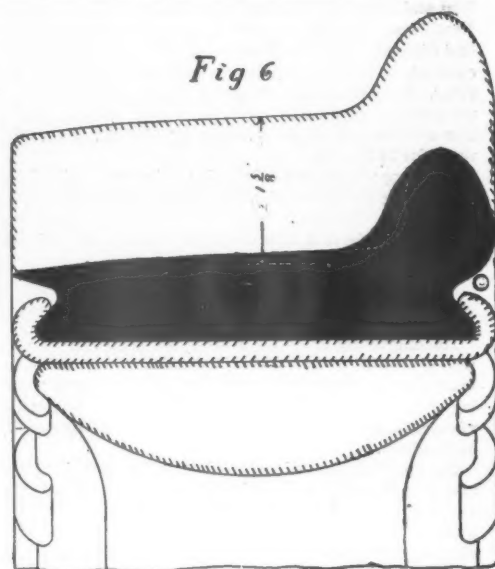


Fig 6

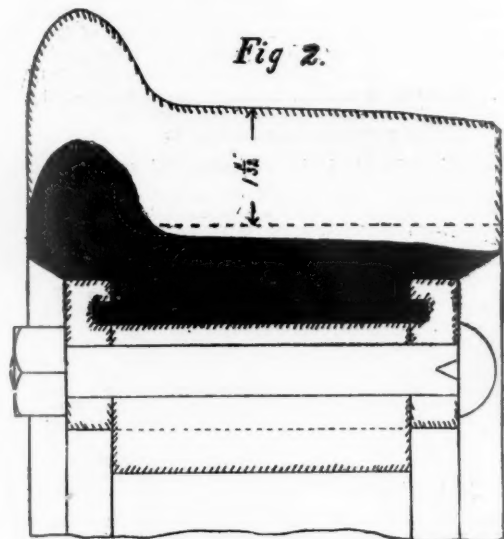


Fig 2.

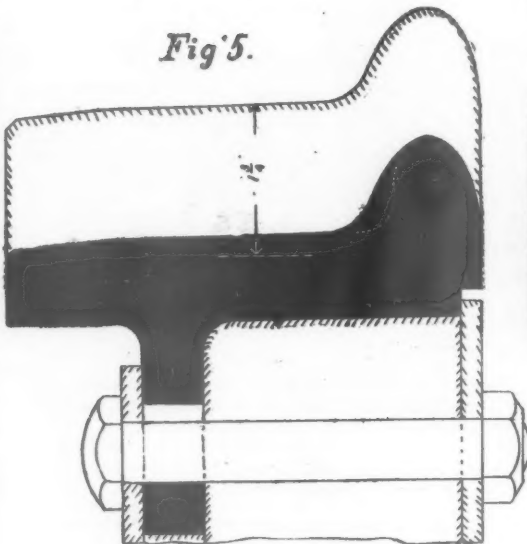


Fig 5.

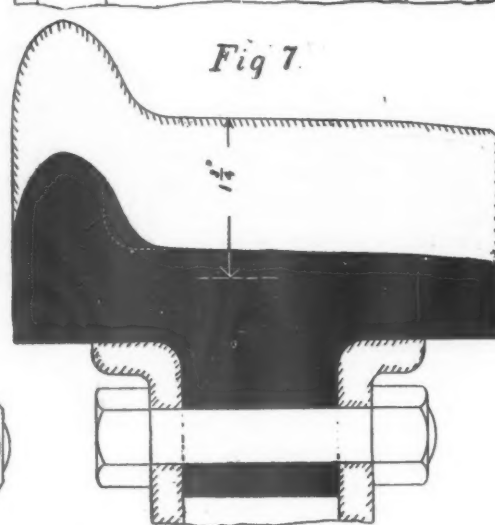


Fig 7.

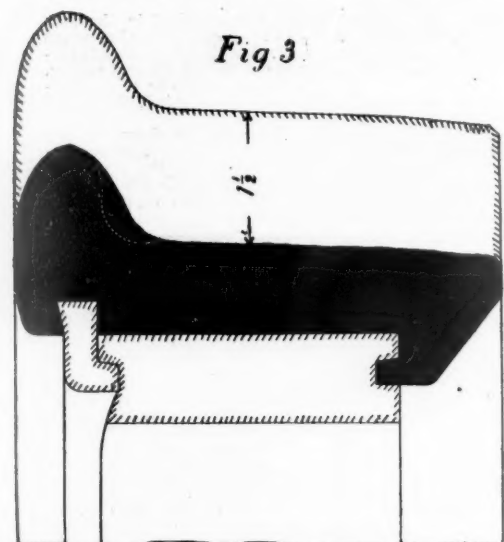


Fig 3.

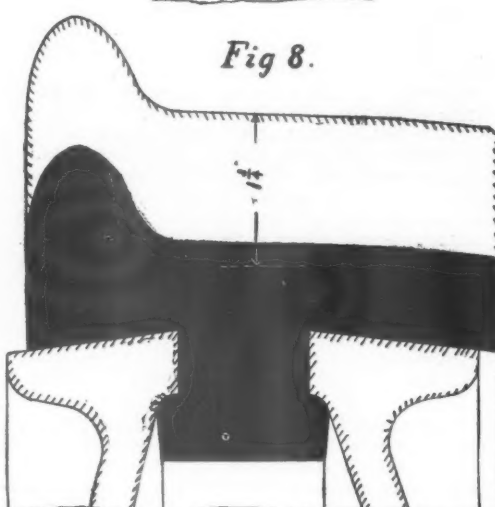


Fig 8.

SHEET 1.

Diagrams with Mr. G. W. Rhodes' Discussion on Tire Fastenings—Western Railway Club.

great satisfaction so far, but we do not know that the flange wear is any better than with the tapered tire.

The greatest object in changing was to facilitate renewals and thus get more service out of our engines. We have a good deal of trouble with our trucks, but we have required our engineers to oil the centre bearings, so that they will pass around curves easily, and in that way we have reduced the flange wear considerably. I would say that oiling the centre plates in the rigid car truck makes it much better.

President BARR: Did any weakness induce your company to change to shrinking the tires on?

Mr. HARRISON: No, sir; we have worn the tires down

now being furnished by the Midvale Tire Co. for some locomotives being built for an eastern road.

I have some samples of broken tire of the type represented in Fig. 5. One is worn down to one inch. It developed a flaw at right angles through the circumference of the tire. This did not cause any accident, as the retaining ring held the tire, and the tire was removed when this flaw was discovered in it. Another one has precisely the same character of flaw, and the tire 15-16 of an inch thick. There is another with the same flaw, and the tire worn down to  $\frac{3}{4}$  of an inch; the last turning of this tire was doubtless one inch, and it was worn away  $\frac{1}{2}$  when this flaw developed and the tire was removed. Here is another case, with the same character of flaw, and the tire worn down to  $\frac{3}{4}$  of an inch.

President BARR: Has not Mr. Rhodes left the Club a little in the dark as to what, from the result of his investigations, is the best form of fastening?

Mr. RHODES: I think not. If you will refer to the report of the last meeting of the Club, page 37, you will find it stated as follows:

"It must be apparent that the best form of fastener is one which secures the tire to the centre in a manner that will allow a slip of the tire without any shearing strain being brought on the fastener. In other words the fastener should be circumferential with the tire, and not at right angles to it."

Mr. HARRISON (B. & O.)—The B. & O. have bolted their driver tires on for 30 odd years. The bolt is a hook-head bolt let in flush on the outside of the tire with a nut on the inside; and the wheel centre is cored out to take the bolt and nut. Fig 2. The fit between centre and tire is tapered  $\frac{1}{2}$  in. to the foot. Seven or eight bolts are used. We are abandoning that mode of fastening and are shrinking our tires on, but we have not been at it long enough for me to give you any definite information on the subject. We are also shrinking the tires on our truck centres. We find that the shrunk tires have given

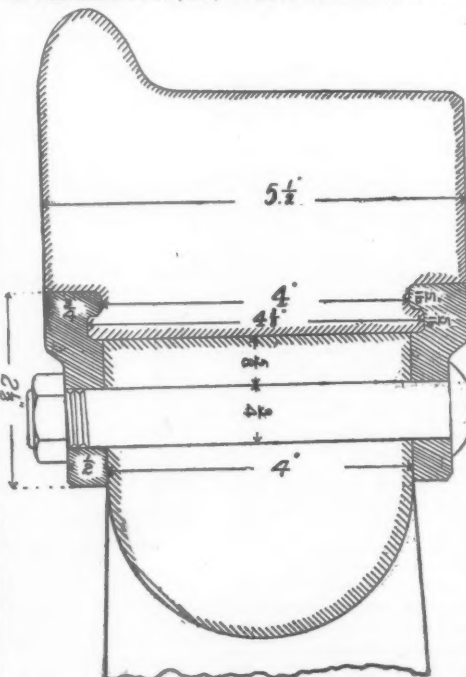


Fig. A.

to  $\frac{3}{4}$  of an inch—of course on yard engines—without breaking and on road engines we have not experienced trouble. I don't know that we have had a broken tire west of the Ohio River within two years. The Baltimore & Ohio for a number of years used cast iron tires and bolted them on in the same way.

Mr. PECK: There is another way of putting on tires. I think it is Mr. Boone's idea; about an inch of hard wood is inserted.

Mr. BARNES: That is the old Griggs patent. By using hard hickory you can get as much pressure as in any other way. I have known tires to be split by driving these wedges too hard.

Mr. CLOUD: I want to ask Mr. Harrison whether he found the bolts and nuts to get loose and what he did to prevent them getting loose. It looks to me that the two methods are identical in results so far as the strain on the tire goes. Why have the bolts been abandoned?

Mr. HARRISON: We have had cases where the bolts would work out, but ordinarily we have no trouble. We simply put the bolt on and screw it up and burr the end of the bolt to keep the nut from working off.

Mr. FORSYTH (after referring to the diagrams upon the blackboard): It seems to me from a view of these tires, when worn down thin, that the fasteners have weakened the tire, and in weakening them they have reduced their life materially, because in a number of cases we have had to take the tire off, not because it is worn off in the tread, but because it has become too thin in the flange. If that is true, then, of the best fasteners we have on the market and that we know of, the question is, if the managers of our roads ask us, "Do you recommend that locomotive tires be secured by a fastener, and if so which is the best one?" what shall we say? I doubt whether I should recommend any of these fasteners—in fact, whether I should say that a locomotive tire should be secured by a fastener of any of these ring forms, for the reason that a number of the cases



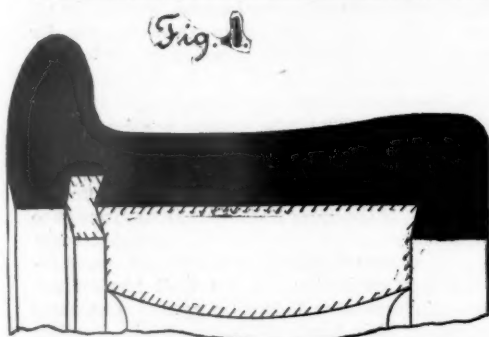


Fig. 2.

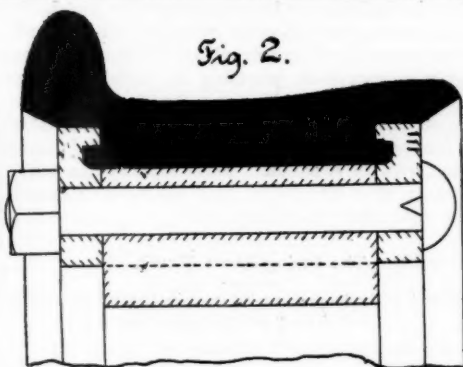


Fig. 3.

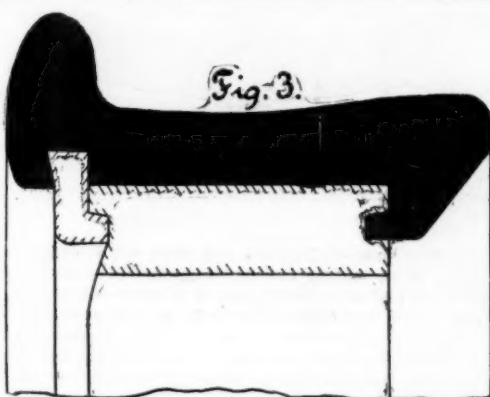


Fig. 4.

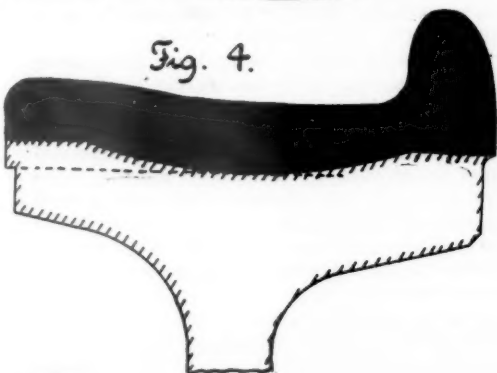


Fig. 5.

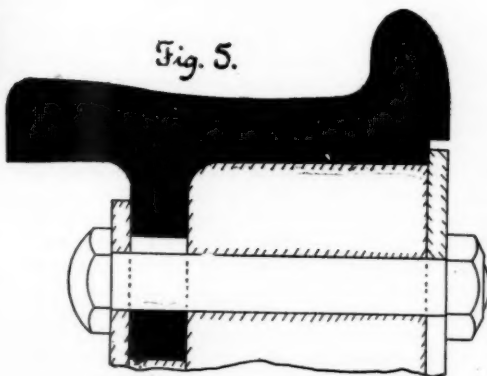


Fig. 6.

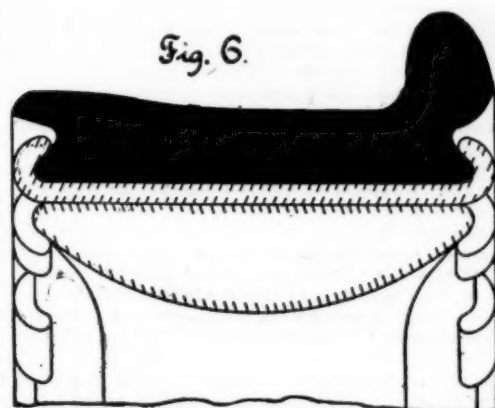


Fig. 7.

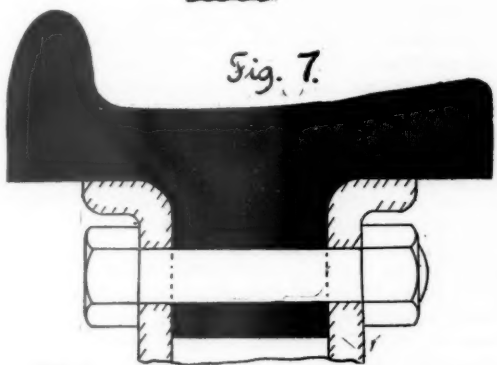


Fig. 8.

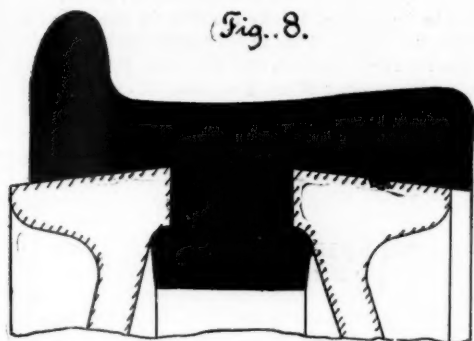


Fig. 9.

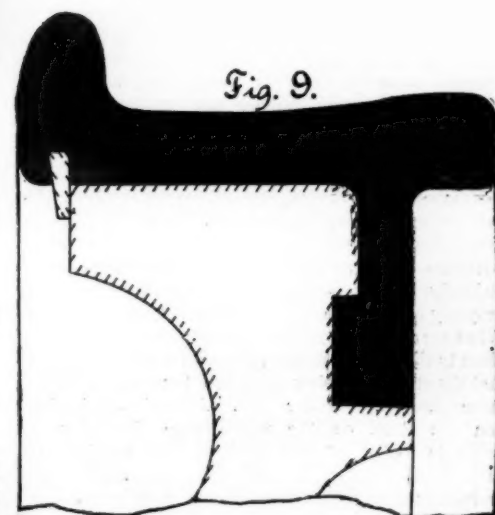
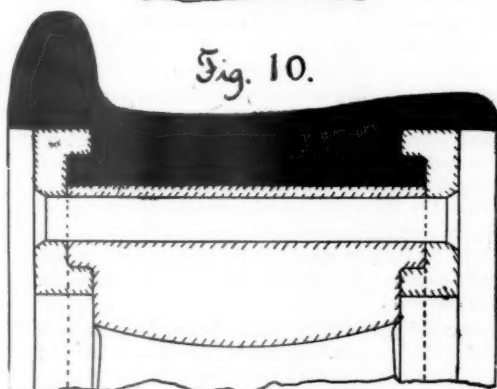


Fig. 10.



SHEET 2.

Diagrams with Mr. G. W. Rhodes' Discussion on Tire Fastenings—Western Railway Club.

which have been presented of broken locomotive tires relate to broken flanges, which the retaining rings would not hold, and for the other reason that almost all tires which do break are broken only in one point, and they could be secured in a much simpler way by putting a bolt through the flange. Now, if you say that that hole will also weaken the tire, let us add a sufficient thickness of tire equal to what your rings and bolts would weigh, or, in other words, let us add in value of steel tire and weight of steel tire what your ring fastenings would cost. Therefore, I think if this question were put to me I should say, Let us rather use a thicker tire and fasten it with tap bolts to keep it from going off sideways.

Mr. RHODES: I would say in correction of an impression that Mr. Forsyth has about the fastener. It was not my intention to have the club think that fig. 2 (Sheet I.) was secured with a fastener circumferential with the

wheel; and my object in citing the accident that occurred on the Chicago, Burlington & Quincy road with a wheel secured that way was to show that the tire did not slip through the rings, and therefore that inspectors, master mechanics and others who are using wheels secured in that way must look out for bolt shearing. In that accident the bolts were clearly sheared off, showing that the tire did not slip around in the rings. It might be, if the manufacturers would take more care and see that the rings are so placed in the tire as to allow to slip around and not hold it so tightly as in the case cited in the paper, beneficial results would follow. The discussion on this subject here closed.

#### Setting of Portland Cement.

In an article on the hardening or setting of Portland cement mortars the *Chemiker-Zeitung* directs attention to some recent experiments made by Herr Schiffner.

These tend to show that setting is retarded by some of the chemical and physical properties of the sand with which the cement is mixed, and also by the influence on the fresh mortar of acid liquids, vegetable oils, organic matter, sulphates of soda and potassium, and soluble salts contained in bricks and earth. Too much water as well as too small a quantity in mixing the mortar likewise prevent proper hardening. Portland cement mortar takes into chemical combination a definite quantity of water, and the highest degree of hardness is attained when this chemical absorption is complete. The formation of hydrosilicates due to this absorption is a gradual process. In a pure cement mortar the percentages of chemically combined water are—

	Per cent.
After mixing.....	0.99
" 4 hours.....	1.41
" 20 ".....	2.29
" 3 days.....	5.62
" 7 ".....	7.58
" 14 ".....	7.96
" 18 ".....	8.45
" 21 ".....	8.91
" 28 ".....	10.52
" 56 ".....	11.60
" 80 ".....	11.56

The discrepancy in the last two sets of figures is ascribed to inaccuracy in analysis since the mortar does not lose any of its chemically combined water except through calcining.

Schiffner's experiments further showed that cement mortar, kept moist for 24 hours after mixing, and then placed under water, improves in hardness with the

duration of its submersion. In the trials under consideration the longest period of submersion was 27 days. If, after mixing, the mortar is not kept moist, it becomes brittle and crumbles. In the cement briquettes kept under water for 27 days, Schiffner found from 10 to 11 per cent. water and from 1 to 1½ per cent. carbonic acid; in the briquettes kept under water for three days there was found from 6 to 7 per cent. water and from 1½ to 2½ per cent. carbonic acid. In dry briquettes the combined water amounted to only 4 per cent., while the carbonic acid figured up to from 6 to 7 per cent. It is concluded, therefore, that to secure the best results in using cement mortar it must not be given opportunity to become dry during the first few days after mixing.

#### Shipbuilding and the Consumption of Iron.

In an article on this subject the *Colliery Guardian* says: "It is not generally recognized how large is the influence of the shipbuilding trade on the iron industry, but a few figures from authority will throw a little light on the matter." It quotes Sir Lowthian Bell, that, in 1869, which was a very dull year in that trade, the consumption of pig iron in that industry was 383,000 tons and reached 840,000 for the year 1883, which was one of the years of greatest output; a year in which the value of commercial shipping launched in the United Kingdom was reckoned at \$93,000,000. From 1883 there was a decline in shipbuilding all over the world and a season of low freights until the latter part of 1888, when the present boom in English iron industries commenced with an increased demand for ships, resulting in as large a consumption of pig iron as has been known in the annals of the trade. Shipbuilding is one of the largest of the industries, when looked at as a consumer of pig iron—that is, as far as Great Britain is concerned. According to one of the tables of Sir Lowthian Bell, given in his work on "The Iron Trade of the United Kingdom," out of a consumption of about 3,263,000 tons of pig iron in the United Kingdom, some 611,000 tons were used in shipbuilding, which, though considerably below the consumption of brick years, amounted to about a fifth part of the consumption of the kingdom, and is comparable with Sir Lowthian's figures of 500,000 tons for the railroad consumption of the same year.

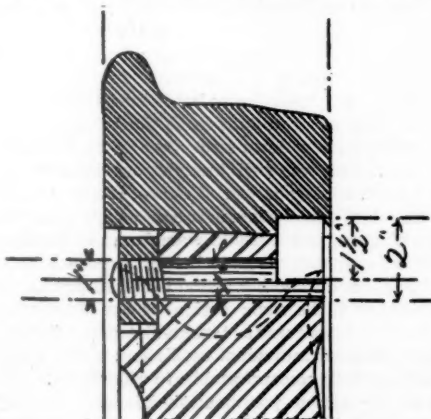


Fig. B.





Published Every Friday,  
At 73 Broadway, New York.

#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The retirement of Mr. Adams from the presidency of the Union Pacific was accomplished in so straightforward and dignified a manner as to call for no special comment, had not some of his opponents chosen to consider it a personal attack upon themselves, and made most uncalled-for counter attacks. It is charged that the property depreciated under Mr. Adams' hands; that unwise and unjustifiable increase was made in the working force, and that the policy pursued by the company was contrary to the interests of harmony. It is even hinted that Mr. Adams was under the influence of corrupt motives. The last, we suppose, nobody believes. When Mr. Gould expresses fears that Mr. Adams may have been corrupt, it has too much the character of a joke to be taken seriously in any quarter. But the charge that the property has depreciated commands more attention. What are the facts? Under the administration previous to that of Mr. Adams, the road was so managed that the stock fell below 30 when the real truth became known. Under Mr. Adams' administration the stock on the whole rose decidedly in value in spite of the most adverse outside circumstances. After a period of unexampled depression in similar securities, he left it in good condition. It is true that he did not make the success that he had hoped. He undoubtedly made mistakes of judgment, as every one else did during the same period. But it is the most striking indication of what Mr. Adams really is, that his failure was better than other people's so-called success.

The canvass for officers of the American Society of Civil Engineers is the liveliest one we remember. Seven tickets have been brought forward besides that of the Nominating Committee. These are all given on another page. We shall now express no opinion with regard to these nominations, except concerning the Secretaryship. It is quite possible that the situation will be cleared up somewhat within the next week or two by the withdrawal of some of the candidates, and in any event the administration and policy of the Society are not likely to be much affected one way or the other by the election of any one of the candidates for the contested offices, except in the case of the Secretary. The central point of the contest is the Secretaryship. This election offers to the members the opportunity which many of them have been waiting for to make a radical change in the administrative head of the Society. This they can do by electing to the Secretaryship a man who will take up the office while he is still young, with the purpose of making it the serious work of his remaining years; who will give to it the best of his time, and thought and energy; who will be ambitious to get from the office not only a living and some distinction, but to be a vital element in its progress and to make its history the best part of his own biography. If the members believe that such a candidate is now

before the Society they had better vote for him in the hope that the ideal permanent Secretary will be found. It does not seem wise to vote with the idea of changing again in a year, or of providing an Assistant Secretary. There is a proposition to make the office somewhat an honorary one and to create the working office of Assistant Secretary. This would be simply fooling with the situation. There should be an active Secretary, liberally paid, to bear the whole responsibility of the office, and to stay there.

#### The Swing Beam Truck.

There is a lively present interest in the relative merits of swing motion and rigid trucks for freight cars, and this subject has been discussed at much length in recent meetings of the railroad clubs, notably the October and November meetings of the Western Railroad Club.

It seems that some representative railroad companies that have been keeping records of the cost of repairs to freight trucks, have become convinced that the swing truck costs more to maintain than its advantages justify. The swing beam truck is troublesome; it gives out when least expected, and requires constant vigilance to prevent disastrous wrecks from its failure. It is not in general built in its best form, but nevertheless, if it were, greater care would be necessary to maintain it than is needed with a rigid truck. Therefore, it is discarded by those who have in view the ideal freight car, equally strong in all its parts. The immediate usefulness of a car is at an end as soon as one of the vital parts is defective. Hence, the importance of a balanced design equally strong and durable in all details. Any increase in the cost of maintenance or in the time which must be devoted to inspection, or any increase in the degree of intelligence required to inspect equipment is to be avoided so far as possible, and resultant actual cost to a railroad company of any one detail of equipment is measured not only by the cost, as shown by the books of the company relating to that equipment, but also by the indirect losses and expenditures resulting from accidents and delays which, while chargeable to the design inducing the failures, yet never appear against it.

Some observing Master Car Builders hesitate to decide against the lateral motion truck, and they consider its removal a radical step needing most careful consideration. We say radical because if one-half of the claims which have been made for the device are true, there is an enormous difference in the functions performed by the rigid and the swing beam truck, and no one in the face of such difference would be justified in making such a change without providing in some way the equivalent of the advantageous features of the swinging bolster.

It is supposed that the swing beam truck accomplishes the following: First, reduction of shocks to the car body and superstructure on curves and irregular track. Second, reduction of shocks to the truck itself. Third, reduction of the blows to the rail and wear of rails on curves. Fourth, decrease of the hauling resistance of trains on curves. Fifth, in stock cars prevents throwing down stock and reduces damages to freight generally during transportation. Sixth, decrease in the percentage of broken flanges of car wheels. Seventh, recently it has been observed that a swing truck materially assists the action of the vertical plane coupler when cars of different lengths are coupled together.

Since this truck was put into use as a matter of necessity, as it was then believed, tracks have been made somewhat straighter, but the speeds have been increased, and, therefore, the shocks to be reduced are as great as they ever have been, and probably are greater; hence, if there ever was a necessity for a swing beam truck under freight cars, that necessity still exists, unless some other and equivalent feature has been added to freight equipment. A conclusion then must be that he who now discards the swing beam truck believes either that an equivalent has been introduced, that there never was the virtue in the design that was claimed for it, or that its advantages are only to be secured at so great a cost as to make the device an impracticable one.

Regarding this claimed advantages of the type of truck, it is clear that when it is well designed it will reduce the lateral shocks to the car, its trucks, and the track. This reduction may be considerable, even 50 per cent., but it has not been proved that such a saving in shock will increase the life of the equipment, or the track. The vertical and longitudinal shocks act to destroy the trucks, loosen the car housings, and ruin the sills. These classes of shocks the swing beam does not reduce. This, then, may be the reason why the swing truck is being discarded; it is not sufficiently useful to

reduce shocks where the shocks need most to be reduced. When a car body is thrown aside as unfit for use, it is almost impossible to point to a single detail that has been benefited by the use of a lateral motion truck. This is not because that truck does not offer the lateral cushion which it was designed to have, but because the evils which that cushion removes are minor ones, and the cars are destroyed by other and greater evils before the minor ones can materially affect a single part. If the life of a wooden car was from 30 to 40 years instead of 8 to 12, then the swinging beam truck might have time to show its value in lengthening the life of car bodies; but the hard service now common induces other destroying agents than those removed by that truck which completely demolish freight equipment before the lateral cushion has a chance to save a penny to offset its cost.

With the truck itself the swing beam has a better chance, for its framing is undoubtedly saved somewhat by the swing motion, and if it were not that the designs of the details of the motion are in general defective, and therefore productive of loss and increased cost of repairs, there would be shown a saving in the truck frame. It is an enormous strain upon a truck frame to withstand without some cushion the lateral blows and pressures brought upon it by the load on car and the car body in passing curves and very irregular track.

As far as the track is concerned, the only advantage which can be had with a swing truck over a rigid one, with a reasonable amount of play in the rigid bolster, is to be had on curves, and if the swing motion be badly designed by having too much freedom and no initial resistance to lateral motion, the lurch of the cars and their loads on curves is more detrimental to the track than if the cars were fitted with rigid trucks.

There are two greater disturbing actions brought upon a curved track than the impact which the swing truck tends to remove. One is the centrifugal pressure caused by deviating the cars from a straight line of motion; this must always exist while trains are passing the entire curve and cannot be relieved by the swing beam truck except may be when the train first strikes a curve. The other disturbing element is the friction of the truck in turning on the centre pin and chafing on the side bearing. This is a more potent destroyer of rails at the beginning and ends of curves than any other agent. To rotate a truck under a heavily loaded car that is "down" on the side bearings requires an enormous rail pressure, which results in excessive grinding at those points of the line where the trucks have to be turned. These points of turning are at the beginning and the ends of the curves where the truck has to be rotated to new positions to accommodate itself first to the curve after leaving the tangent and then to the tangent after leaving the curve. We have seen rails worn, for this reason, on tracks in the coal regions, in a service in which cars are frequently overloaded, so much as to increase the track gauge one inch.

How a swing truck can reduce the hauling resistance on curves is not clear. It cannot keep the axles radial to the curve or allow the wheels to roll independently. Neither can it reduce the effective degree of curvature an appreciable amount. It must be acknowledged, however, that by a greater weight is thrown upon the outer wheels on a curve, and perhaps by this action the resistance might be slightly reduced because the inner wheel could slip around easier to make up the difference in the length of the outer and inner rails. And, at the front of the train, the pulling of the locomotive, if the train be a slow one, would likely bring the greater weight on the inner wheel by hauling the cars to the inside of the curve, this being the natural tendency, as the car couplers are connected to the car body and not to the trucks. This reduces the weight on the outer wheels and would allow them to slide along the track easier as they might be expected to do in traversing the longer path on the outer rail.

It has been admitted that the swing beam truck is better for stock cars, as with it there is less liability of the stock being thrown down; but if the lateral motion is too free there is a resultant oscillation which will be more liable to throw down stock than if rigid trucks were used. This was well brought out by remarks made by Mr. Hickey at the Western Railway Club. He cited a case where some new cars which had been fitted with swing beam trucks were found to oscillate widely on tangents, whereas it was expected there would be a much smoother action than had previously been found with the same design of car fitted with rigid trucks. There was a "snake-like motion" to the train as well as an individual oscillation, which made the cars decidedly uncomfortable to ride upon. The cause of the action just mentioned is easily seen by any one who will examine the ordinary swing motion



freight truck; there is but little tendency for it to stay in the centre under the car. The case is exactly parallel to that of the locomotive swing motion truck, which we have referred to several times this year, the principal argument regarding which was given in the *Railroad Gazette* Aug. 22, 29 and Sept. 5, and the conclusions there drawn are just as applicable to a freight truck as to a locomotive truck. The point brought out in that argument was that with any swing truck there should be the possibility of a lateral movement, but that this movement should not take place freely. There should be a resistance to motion from the very start. This is termed the initial resistance, and is obtained by spreading apart or drawing together the bottom of the swing links, or by the use of springs with an initial tension, as is now done in several recent designs of passenger car trucks.

Broken truck wheel flanges are not the result of a lack of lateral motion but rather of the inertia of the wheels, axles and the parts connected thereto. When a flange is struck by a switch point or a guard rail it is not saved by the large lateral motion of the whole truck but rather by the motion provided in the axle boxes, and it has not been shown that broken flanges are more common on wheels in rigid trucks than on those in swing beam trucks.

It requires no further argument than that which was given in the *Railroad Gazette* Oct. 3, 1890, to show the value of a swing truck in assisting the action of the vertical plane coupler; but as one railroad man has said, we are not building trucks to accommodate couplers, the couplers must accommodate the trucks. However this may be, the fact remains that the swing motion provides for a lateral displacement of the ends of the car varying in amount from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  in. each, the effect of which is to reduce the difference in lateral displacement of the ends of car coupled with vertical plane couplers and to enable them to pass sharp curves without straining the bodies or draw gear in cases which could not be provided for by the rigid truck. Some other scheme might be devised (as we have before indicated) for allowing for this lateral displacement; but until it is provided for any one is justified in hesitating to discard the swing beam truck.

One of the strongest advocates for the change from a swing beam to a rigid truck is a man who has been urging the necessity for running freight cars in passenger trains, for express freight, and this has been offered as a reason why the vertical plane coupler should be used on all freight cars so that couplings in the passenger trains could be made without links and wedges. We are curious to see how the rigid truck advocate will couple a 34-ft. freight car with rigid trucks and vertical plane couplers to a 60-ft. baggage car and safely pass onto all sidings unless he provides for more lateral motion in the stirrups holding the drawbars than is now common.

This subject is one of great importance to all who have to do with designing and operating railroad equipment, and it is just such a one as it will be profitable for the M. C. B. Association to investigate.

#### A Collision under the Block System.

Ten persons were killed and eight injured by a collision on the Great Western of England, near Taunton, on the morning of Nov. 11, at 2 o'clock. The English papers, for which we have waited, give few particulars not already known from the cable dispatches. A southbound freight train backed off upon the northbound track, and while standing there was run into by a northbound passenger train traveling at high speed. Six of the passengers were burned to death. It appears that the signalman, who was old and had received a severe injury to his head some months before, simply "forgot" that the freight train was standing there, the night being very dark and rainy, and gave a clear signal to the passenger train.

A disaster like this will at once raise the query in some quarters whether we have not here a weakness in the block system which so largely detracts from its value as to warrant a firmer confidence in the flagging system, and possibly to show the former to be as bad as the latter. It will at least be said that there is reason for hesitating to change present practices. But while it is a sufficient answer to this criticism to say that the record under the block system, even with disasters like this and like that at Meadows, N. J., in October, 1885, is several hundred per cent. better than can be shown under any other system, it is not right to rest with that argument.

It can be further claimed that there are various ways in which a blunder of this kind can be provided against. Doubtless the simplest of these is that suggested by *The Engineer*, which is a modification of

the staff system. Conductors would be ordered never to use the opposite main track without first getting from the signalman a staff, and this staff would consist of a key which could not be withdrawn from its socket until it had first locked the home signal protecting the track to be used by the freight train. Such a rule ought to be more easily enforceable than the plan used on some American roads—and prescribed, but not used, on others—of sending out a flagman the same as if no fixed signals existed. It is undeniable that this American plan, of sending a man with a flag to stop a train which he can plainly see is already fully warned by a fixed signal, is hard to enforce. A rule to cover all contingencies must be stricter than is necessary at ordinary times, and if brakemen are allowed to relax it on some occasions they will take the liberty of doing so for others. On the other hand, a visible, tangible staff, constantly used, would lead to a regular habit on the part of all the men concerned, which would become in a sense self-enforcing and could doubtless be employed without causing delay.

The Skyes system, if connected with all switches in a block, would afford protection, as the signalman, to admit a southbound train to the northbound track, would have to ask leave from another signalman the same as in plain block signaling; but there are complicated junctions where this would not be a very satisfactory arrangement, and this use of the Sykes system would impair its efficiency for its main purpose by making suspension of the rules too familiar; moreover, the Sykes apparatus is much more costly than a simple thing like Annetts' key. A track-circuit electric lock, by which the presence of the freight train on the track would hold the signal at danger, would be more costly than a staff lock, and its availability would in some localities be more restricted, as for instance where it would be desirable to protect, by the same device, other trains than simply those standing on the main track; but it is already in use at many places in this country and it behooves American railroad officers to see that no careless reliance on the immunity afforded by the law of chances shall lead them to ignore its value for the purpose for which it was so sadly wanted on Nov. 11. We do not mean that track-circuit locks have been put in for the special purpose of protecting a train situated like that at Taunton, but that the existence of the circuits for other purposes has afforded protection for cases of this kind and has shown by an object lesson the adaptability of the principle to the need we are considering. It would be a pity to have a Taunton collision occur on an American road, where a track-circuit lock was provided, but was out of use because not properly maintained and cared for; and yet we fear that just such a contingency is within the range of possibility.

Perhaps we should have mentioned at the outset the desirability of providing sufficient side tracks to permit freight trains to set off for passenger trains without obstructing any other main track; but this should go without saying, and we may consider simply the problem as it presents itself where side tracks have not yet been provided. The block system is the best in spite of its faults; but there is reason to be cautious in ascribing to the system the faults of those who establish or administer it.

On the question of employing aged men for signalmen, *The Engineer* has little to say, except that the oldest men are often the best. This question is more important in England than here on account of the more stable character of "labor" in that country than in this (one of the noticeable facts shown by investigations over there is the numerous 20, 30 and 40-year terms of service of train and station men); but the problem must be met by American railroad officers, and is of increasing importance as our country grows older. While all agree in the view that experience is valuable and must not be lightly thrown aside, it must be admitted that every man must step aside some time; and the thing most needed is a workable rule for deciding when this shall be. The army affords an example, and it will be well if that example shall be studied more than it has been. While it cannot be rigidly followed, railroad men might do well to imitate it so far as to reverse their present rule. Now, we employ men practically for life, and in exceptional cases crowd them out before the time expires; the other way would be to engage them for a limited period, say until they are 63, and prolong the term only for definite reasons; continue to have exceptions, but have them work in favor of the employé instead of against him. Such a rule would have to be adopted very slowly and gradually, and that is the reason we mention it so long before our readers are ready to hear it.

#### International Railroad Law in Europe.

On the 14th of October the "International Treaty on Freight Transportation" (*Convention internationale sur le transport des marchandises*) was signed at Berne. The substance of this treaty was presented to our readers three years ago (*Railroad Gazette*, Aug. 5, 1887).

The contracting parties are Germany, Austria, Belgium, France, Hungary, Italy, Luxembourg, Holland, Switzerland and Russia—practically the whole of continental Europe in which there is any international business of importance. It deals with questions of liability and of procedure, rather than with details of tariffs. With regard to the latter it is simply provided that they shall be public, and that there shall be no personal discrimination. A central office is established to give publicity to international tariffs, and, on demand of the parties concerned, to act as a clearing house for international business; but this office is not charged with the enforcement of the provisions of the law, nor does it come in contact with the general public.

By the terms of the treaty the railroads of the different countries are obliged to accept international business, and to give through bills of lading. These are made out in duplicate in a form prescribed by the treaty, serving at once for bill of lading and way bill. The duplicate is given to the shipper; while the goods are en route, only the shipper himself, with his bill of lading in hand, is allowed to give any changes of direction or supplementary orders. On delivery of the goods on the original bill of lading, all rights connected with the duplicate bill of lading expire.

In case of loss or damage, the roads are, as a rule, responsible for actual value. In case of detention, the amount recoverable is based on percentages of the freight charge; but, by special declaration, the shipper can, for a small payment, make the roads liable for whatever amount of damage the delay may cause. Suits for recovery may be instituted against the company which receives the goods, or that which was to deliver them, or that on whose lines the damage is located; the choice being left to the complainant. A judgment having been given in any one country, the courts of other countries are bound to assist in its execution, except so far as it would conflict with the provisions of their own law; no revision of the record being allowed in questions of fact. Thus a German court may find itself legally bound by a decision of fact in France or Russia. The railroads are given a lien upon the goods transported, and the road making final delivery to the consignee is responsible for having all accrued charges properly paid.

The treaty is made for three years, with a probability of lasting three years longer. It is likely to go into actual effect in the course of a few months, and will be watched with great interest as being by far the most extensive application of international law to questions of private rights.

#### The United States Report on Railroad Labor.

The Fifth Annual Report of the Commissioner of Labor deals with the subject of railroad employes exclusively. The statistics are much more complete than any which have hitherto been collected, and the high reputation of Colonel Wright is the best guarantee of their accuracy.

We have returns from 60 corporations employing 241,910 men, or more than one-third of the railroad employes in the country, the total number being about 700,000. The roads which form the subject of Colonel Wright's investigations have been carefully selected from the different groups of states, so as to give characteristic returns for all parts of the country. We regret to note, however, that the Northwest, Southwest and Pacific sections of the country are represented by but one road each. The figures given are not mere averages, but are carefully divided into classes of occupation and grades of labor.

Taking all classes of employes together, it appears that the numbers receiving various rates of wages are as follows:

(Employes paid by the mile, trip, piece, contract, or commission are excluded.)

Groups of actual daily earnings or rate nearest to average daily earnings.	Employees.		Groups of actual daily earnings or rate nearest to average daily earnings.	Employees.	
	Number.	Per cent.		Number.	Per cent.
Under \$0.21	656	0.29	\$1.21-\$1.40	72	0.03
\$0.21-.40	817	0.36	1.41-1.60	87	0.04
.41-.60	1,867	0.83	1.61-1.80	19	0.01
.61-.80	3,352	1.49	1.81-2.00	205	0.09
.81-1.00	9,539	4.25	2.01-2.20	25	0.01
1.01-1.20	48,708	21.69	2.21-2.40	5	0.00
1.21-1.40	48,476	21.59	2.41-2.60	3	0.00
1.41-1.60	33,856	15.08	2.61-2.80	27	0.01
1.61-1.80	25,608	11.47	2.81-3.00	6	0.00
1.81-2.00	20,708	9.22	3.01-3.20	4	0.00
2.01-2.20	4,912	2.19	3.21-3.40	28	0.01
2.21-2.40	7,416	3.39	3.41-3.60	2	0.00
2.41-2.60	6,163	2.75	3.61-3.80	9	0.00
2.61-2.80	4,443	1.98	3.81-4.00	1	0.00
2.81-3.00	2,958	1.32	4.01-4.20	8	0.00
3.01-3.20	517	0.23			
3.21-3.40	1,324	0.60			
3.41-3.60	1,340	0.60			
3.61-3.80	304	0.14			
3.81-4.00	780	0.35			
4.01-4.20	291	0.13			
			Total.....	224,570	100.00



It will be seen that 78.98 per cent. are paid at rates ranging from \$1 to \$2 per day. The average daily rate of all the employes paid by specific time on the sixty roads is \$1.64½ (as will be shown on page 160); yet 63.87 per cent. of the whole number received less than the average rate of all, while only 36.13 per cent. received above the average for all.

Looking at time employed, we find that of the 224,570 employes involved, 56,404, or 25.1 per cent. of the whole number, are employed 25 days or less out of the whole year; 25,684, or 11.5 per cent. of the whole, are employed from 26 to 50 days; 31,014, or 13.8 per cent., are employed from 51 to 100 days, and 18,861, or 8.4 per cent., from 101 to 150 days; these numbers, which constitute 58.8 per cent. of the whole number of employes working on the roads considered, were employed less than one-half year. It will also be seen that 44,331, or 19.7 per cent., were working from 151 to 300 days; this leaves 42,719, or 19 per cent. of the whole, working from 301 to 365 days, and 5,557, or 2.5 per cent. of the whole, working more than the full year—that is, over 365 days. These two amounts constitute 21.5 per cent. of the whole as working the whole year and over.

The work day on most of the roads is 10 hours, and all the tables as to time and earnings have been reduced to the ten-hour basis.

Taking the different classes of employes, we find the rates of pay to be as follows:

DAILY RATES.												
[Employee's paid by the mile, trip, piece, contract, or commission are excluded.]												
OCCUPATION.	Under \$1.01.		\$1.01 to \$1.50.		\$1.51 to \$1.80.		\$1.81 to \$2.		\$2.01 and over.		Total persons.	Average rate.
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.		
Baggagemasters (35 roads).....	105	9.5	407	36.9	198	17.9	228	20.7	166	15.0	1,104	\$1.63
Baggagemen (18 roads).....	87	8.8	526	53.2	195	19.7	101	10.2	80	8.1	989	1.51
Blacksmiths (43 roads).....	1	0.1	142	9.9	178	12.4	288	20.1	826	57.5	1,435	2.19
Brakemen (58 roads).....	139	0.7	4,065	20.2	8,392	41.7	6,651	33.1	870	4.3	20,117	1.78
Carpenters (51 roads).....	5	0.1	1,125	13.6	1,647	19.9	2,579	31.1	2,921	35.3	8,277	1.96
Conductors (56 roads).....	7	0.1	32	0.6	80	1.6	434	8.4	1,631	89.3	5,184	2.63
Engineers (54 roads).....	4	0.1	45	1.5	60	2.0	74	2.5	2,791	93.9	2,974	3.22½
Enginemmen (15 roads).....	1	0.1	26	2.6	9	0.9	10	1.0	932	95.4	968	3.19
Firemen (59 roads).....	75	1.3	1,605	28.1	2,072	36.2	932	16.3	1,033	18.1	5,717	1.79½
Flagmen (31 roads).....	795	40.0	848	42.6	112	5.6	214	10.8	20	1.0	1,989	1.13
Foremen (56 roads).....	6	0.1	3,729	52.6	634	8.9	549	7.8	2,167	30.6	7,085	1.88
Laborers (58 roads).....	4,910	5.5	80,575	90.1	3,175	3.5	621	0.7	14	0.2	89,429	1.26
Machinists (40 roads).....	24	0.5	268	5.9	593	13.2	655	14.8	2,956	65.6	4,506	2.18
Masons (28 roads).....	.....	.....	94	10.8	47	5.4	64	7.3	639	76.5	874	2.45½
Painters (38 roads).....	6	0.4	338	21.4	306	19.3	402	25.4	531	33.5	1,583	1.95
Switchmen (30 roads).....	109	2.5	2,054	48.2	390	9.4	635	14.9	1,065	25.0	4,202	1.50½
Telegraph operators (38 roads).....	520	12.3	2,305	54.7	650	15.6	316	7.5	416	9.9	4,216	1.43½

The relatively small figure of annual earnings is due to the shortness of time employed in many of the lines of work. The figures, which Colonel Wright has not collected in this form, are as follows:

AVERAGE NUMBER OF DAYS EMPLOYED.	
Baggagemasters.....	233
Baggagemen.....	201
Blacksmiths.....	207
Brakemen.....	153
Carpenters.....	164
Conductors.....	207
Engineers.....	207
Enginemmen.....	242
Firemen.....	155
Flagmen.....	206
Foremen.....	246
Laborers.....	98
Machinists.....	193
Masons.....	93
Painters.....	176
Switchmen.....	164
Telegraph operators.....	164

As Colonel Wright well says, this migratory character of railroad labor constitutes a most remarkable feature in the whole situation, and one which has never been properly studied. We regret to see that many of the figures of annual earnings are given on an assumed full time, instead of on the actual time worked. This was doubtless, an oversight, but it is a pretty serious one.

The daily wages paid in different sections of the country are as follows:

	New England.	Middle.	South Atlantic.	Central North-western.	North-western.	South-western.	Pacific.
Baggagemasters.....	\$1.78	\$1.58	\$1.32	\$1.46	\$1.10	\$1.79	\$2.00
Baggagemen.....	1.67	1.46	1.42	1.61	1.49	1.55	1.94
Blacksmiths.....	2.36	2.06	2.39	2.25	2.67	2.36	3.11
Brakemen.....	1.80	1.73	1.26	1.86	1.95	1.75	1.96
Carpenters.....	2.14	1.89	2.10	1.92	2.32	2.14	3.07
Conductors.....	2.82	2.54	2.38	2.61	2.92	2.85	3.00
Engineers.....	3.32	3.15	2.91	3.07	3.52	3.29	.....
Enginemmen.....	3.24	3.20	1.52	2.27	.....	.....	.....
Firemen.....	1.89	1.72	1.29	1.79	2.04	1.90	.....
Flagmen.....	1.24	1.16	.....	.....	.....	1.02	1.64
Foremen.....	2.33	1.81	1.66	1.81	1.88	1.78	2.46
Laborers.....	1.51	1.23	0.88	1.21	1.21	1.30	1.87
Machinists.....	2.23	2.05	2.70	2.25	2.69	2.43	3.06
Masons.....	2.19	2.44	3.00	2.76	2.54	3.00	.....
Painters.....	2.01	1.88	2.02	1.91	2.42	1.72	2.81
Switchmen.....	1.78	1.27	1.11	1.53	2.30	2.15	2.20
Telegraph operators.....	1.42	1.34	1.50	1.47	1.67	1.38	2.09

The high wages in New England form a specially noticeable feature in this table.

The average daily rates in the United States and Great Britain compare as follows:

GREAT BRITAIN.		UNITED STATES.	
Occupations.	Daily rate.	Occupations.	Daily rate.
Engineers and drivers.....	\$1.46	Engineers and engine-men.....	\$3.29
Firemen.....	.91	Firemen.....	1.79½
Guards, passenger and goods.....	.97	Conductors.....	2.63
Shunters.....	.85	Switchmen.....	1.50½
Signalmen.....	.81	Flagmen.....	1.13

No figures are given for time employed in Great Britain, so that it is impossible to compare annual earnings; nor are the guards on English roads comparable, in the character of their duties, with American conductors.

Another and almost wholly independent part of the report deals with the relations of employes and corporations to one another. About 600 corporations have replied to the inquiries of the department on this subject. The first question related to the use of intoxicating liquors. Three hundred and seventy-seven roads have regulations prohibiting their use. These rules are growing rapidly in favor. It is but a few years since any road placed restrictions of this kind.

The second inquiry related to dwelling houses furnished by corporations for the use of employes. Twenty-five roads make somewhat general provision of this kind; 149 furnish dwellings to section hands, trackmen, etc., in remote places. About half furnish no houses whatever.

The third inquiry related to beneficiary institutions. Nineteen roads maintain such institutions of their own. Fifteen assist outside beneficiary institutions, 20 contribute to the railroad work of the Young Men's Christian Association, 21 contribute to outside hospitals, and six to regularly established railroad associations for the benefit of employes. Of the special information furnished under this head a large part is taken from the third annual report of the Interstate Commerce Com-

had been maliciously misplaced. The railroad commissioners made a report to the effect that there was no satisfactory evidence in support of the proposition that a rail had been removed; that the rate of speed was about 20 miles per hour; that the air brakes were suddenly applied, causing the structure to give way; and that the structure was faulty in the following particulars: The bents, considering the nature of the ground, it being boggy and spongy, were too far apart; the ties were too widely spaced; the guard rails [timbers] were in a state of decay and but few were properly fastened, and they were so frail as to afford no safeguard; much of the timber in the bents, especially caps and sills, had more or less decayed; the bents were not securely sway-braced; some of the piles supporting the bents were unsound; many of the stringer bolts had been allowed to become loosened.

This at once brought out a letter from Mr. Richard Koehler, Manager of the road, stating that a number of disinterested engineers and bridge builders had expressed the opinion that the bridge was "not unsafe," and giving evidence of malicious wrecking, as follows:

The wreck occurred at 8 p. m., and people were around the place all night; at daylight a rail was found to the west of the track; it came from the east side of the track, had been turned around, and had no fish plates in it, nor any evidence that the plates or bolts had been violently detached from it. The spikes on the east side at the critical point seem to have been drawn by a claw-bar and not displaced by a derailed wheel. It is believed that this rail could not have been smuggled there during the night, as the bystanders would have seen any such movement. The track was measured and 20 rails on each side found displaced; only 39 rails besides the one in question could be found. This rail was not bent or marked in any way except in one place, where it had apparently been struck by a wheel, this mark supporting the theory that the rail had been taken out and laid across the west rail of the track. The course taken by the wheels after derailment and the marks on the sleepers indicated that this rail had been in position next south of the last rail remaining in the track on the east side. The engineer sounded his whistle just before applying the brakes, and the wreck occurred in a moment after; the entire time between the sound and the completion of the fall not exceeding three to five seconds. The night was very foggy. As the engineer (who was killed) knew that a violent application of the brakes while on the trestle would be injudicious, it is assumed that he

ANNUAL EARNINGS.												
[Employees paid by the mile, trip, piece, contract, or commission are included.]												
OCCUPATIONS.	Under \$100.		\$101 to \$300.		\$301 to \$600.		\$601 to \$900.		\$901 and over.		Total persons.	Average earnings.
	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.	Num-ber.	Per-cent.		
Baggagemasters (36 roads) . . . . .	239	19.0	243	19.3	472	37.4	291	23.1	15	1.2	1,260	\$394
Baggagemen (18 roads) . . . . .	301	29.7	205	20.2	390	38.5	118	11.6			1,014	311
Blacksmiths (43 roads) . . . . .	278	16.2	238	15.0	507	29.5	620	36.1	55	3.2	1,718	467
Brakemen (58 roads) . . . . .	11,062	46.7	5,605	23.6	5,185	21.9	1,831	7.7	16	0.1	23,699	212
Carpenters (51 roads) . . . . .	2,260	26.3	2,003	23.3	2,752	32.1	1,536	17.9	32	0.4	8,583	330
Conductors (56 roads) . . . . .	1,080	17.6	854	13.9	897	14.6	1,904	31.1	1,399	22.8	6,134	575
Engineers (55 roads) . . . . .	550	9.9	464	8.4	530	9.6	799	14.4	3,197	57.7	5,540	967
Enginemnen (15 roads) . . . . .	148	11.0	124	9.2	165	12.2	288	21.3	626	46.3	1,351	787
Fireman (60 roads) . . . . .	2,936	30.7	1,791	18.5	2,810	29.1	1,978	20.4	127	1.3	9,672	337
Flagmen (31 roads) . . . . .	652	30.9	592	28.0	786	37.2	80	3.8	1	0.1	2,111	244
Foremen (56 roads) . . . . .	1,001	14.1	1,273	18.0	3,068	43.7	1,135	16.0	579	8.2	7,086	463
Laborers (58 roads) . . . . .	54,834	60.9	21,868	24.3	13,285	14.7	116	0.1	1	0.0	96,104	124
Machinists (40 roads) . . . . .	1,026	20.6	933	19.1	1,284	24.2	1,565	31.4	232	4.7	4,984	431
Masons (28 roads) . . . . .	390	44.7	204	23.4	197	22.5	80	9.1	3	0.3	874	227
Painters (38 roads) . . . . .	427	24.4	388	22.2	588	33.6	340	19.4	7	0.4	1,750	348
Switchmen (30 roads) . . . . .	1,579	37.0	859	20.2	1,552	36.4	255	6.0	17	0.4	4,262	264
Telegraph operators (38 roads) . . . . .	1,714	40.7	1,043	24.7	1,224	29.0	214	5.1	21	0.5	4,216	235

mission. Special mention is made of the Atchison, Topeka & Santa Fe, whose relief association, though only established in 1887, has annual receipts of \$135,000, and has given relief during the year to 18,704 employes. The Baltimore & Ohio Relief Association has not suffered from its change of legal status, 98 per cent. of the old members having joined the new voluntary association. Mention is also made of the relief associations connected with the Cincinnati, Hamilton & Dayton, the Bee line, the Grand Trunk, the Pennsylvania, the Reading and a number of others; also of the insurance features in the Brotherhood of Locomotive Engineers, the Order of Railway Conductors, Brotherhood of Brakemen, Brotherhood of Firemen and the Switchmen's Mutual Aid Association.

The subject of employes' liability is treated at some length. The English law of 1880 was first copied in some of its essential features by an Alabama statute of 1885, and then in Massachusetts in 1887. There have been special statutes or decisions, looking in the same general direction, in California, Colorado, Dakota, Florida, Georgia, Iowa, Kansas, Minnesota, Montana, Wisconsin and Wyoming. In other states the old common law rule still applies.

#### A Wreck on a Trestle.

The derailment of a Southern Pacific passenger train on a trestle at Lake Labish, near Salem, Or., on the night of Nov. 12, making a bad wreck, in which three persons were killed, has been the occasion of a great deal of discussion in the newspapers of Oregon. The trestle evidently was old and out of repair, and observers of various degrees of intelligence at once concluded that its weakness was the cause of the derailment; but the railroad officers soon put forth the theory that a rail

must have seen positive danger, warranting him in trying to stop at all hazards.

As the commissioners do not give any dimensions or accurate data of any kind, their finding is very far from conclusive, and it is not strange that they are accused of issuing this report to appease popular clamor; but in view of the road's presentation of the argument about the danger to the trestle from violent application of the brakes, and its omission to answer any of the specific damaging statements made by the commissioners, it seems fair to conclude that full proof of the malicious removal of the rail would not clear the road from blame for running a passenger train over the trestle at any but the very lowest speed. The statements about the flimsiness of the guard timbers strongly tend to show this, and the evidence concerning loose bolts is corroborated with particularity by the newspaper accounts.

A locomotive engineer running a night passenger train on one of the Western roads, and using an engine equipped with the electric headlight, recently had to send his engine to the shop for a week and was given another which had a common headlight. After using this for one trip he applied for (and obtained) a vacation until his regular engine could be repaired. The value placed upon the electric headlight by numerous runners who use it has been well known heretofore, and this testimony only confirms what they have said; but it is the testimony of acts instead of words, and so is somewhat more striking. And, if we only stop to think of it, this engineer's opinion is the natural or normal one, and that of the runner who should be satisfied with the ordinary oil lamp would be the abnormal one. We run trains at night simply on the strength of general experience, which is supposed to



teach that it is better to sacrifice a few lives occasionally by washouts and malicious obstructions than to retard the progress of the human race in its ambition to live a lifetime in 50 years instead of 70. It has been objected that the strongest light will not throw its rays around a curve, and that, therefore, the powerful arc light, shining a mile ahead, is of doubtful value; but this engineer's opinion indicates that an effective light, available a part of the time, is well worth having. A road made up wholly of curves would be a comparatively poor field for a powerful light, but there are few such roads; and we are not sure but there are a good many places in which a large arc light would be worth its cost on a locomotive even without the reflector, or with one which should diffuse the light over a greater area laterally. Such a light placed on top of the cab of a switching engine would often be useful. It would often have a dazzling effect, but this would be always under perfect control, for the engineer can stop the dynamo at any moment. The dazzling effect of a bright headlight has been regarded as an objection to the use of these lights on double track roads, but we understand that the runners on the double track roads now using them find no fault.

Trials of the Westinghouse Quick-Acting Freight Brake took place on the 3 ft. 6 in. gauge lines of South Australia early in October. No other competitor appeared, the Eames, Boyden, Automatic Vacuum (England) and other brakes not being represented on the trial ground. The brake was subjected to several severe and special tests. Several graduating runs made down grades of 66 and 88 ft. per mile were especially designed to test the possibility of exhausting the brake by repeated applications, but the result of an emergency stop at the foot of the grade showed that this fear was ill-founded, while the train pipe pressure was invariably higher at the foot than at the summit of the grades.

Trials were also made as to the time the brake took to leak off. In 30 minutes the brake had only leaked off on two vehicles out of 50. Switching trials showed that there was no loss of time when the braked cars were handled by experienced men, the loss of time in uncoupling the hose pipes and shutting the taps being compensated by the increased command over the braking of the cars.

The tests were conducted by a board of experts which included Mr. D. H. Neale, who is well known to many of our readers, and were witnessed by the Minister for Works, the Commissioners of Railways and others. All expressed themselves as much pleased and astonished at the performance of the brake. The results were graphically recorded by the Kapteyn instrument.

Other tests will shortly be held in Queensland and New South Wales. Victoria has already adopted the Quick-Acting Freight Brake, which is being rapidly fitted, but the other colonies have as yet used the Westinghouse on passenger stock only.

Some very good work is being done on the Pennsylvania lines west of Pittsburgh by the standard Pennsylvania locomotives, class "O." These engines have 18 x 24-in. cylinders, 62-in. drivers, and weigh 91,900 lbs. total, and 53,300 lbs. on the drivers, with a tender with a tank capacity of 2,400 gallons. The following are samples of runs made on a comparatively level track; they represent the regular work of the locomotives:

Engine No. 346 runs from Logansport to Chicago, a distance of 117.4 miles, in 1 hour and 58 minutes running time, or at the rate of 59.5 miles per hour. The total time is 2 hours and 45 minutes. The trains make 19 stops, occupying 47 minutes total. The load consists of five sleepers, two coaches, and one baggage car. This engine also runs from Winamac to Peoria Junction, a distance of 25 miles, 22 minutes from start to stop, with a load of three sleepers, two coaches, and one baggage car.

Engine No. 69 of same class runs from Denison to Newark, 67 miles, in 1 hour and 7 minutes, with a load of three sleepers, two coaches, and one baggage car. The total time is 1 hour and 22 minutes. The train makes three stops and slows three times, all of which takes 15 minutes.

A contemporary has said that the Boston & Albany has ordered the pilots taken off all its freight engines, and makes the statement a text of a more or less sagacious little editorial. We are informed that the statement "is not true. The company has not changed the policy which has obtained for more than 20 years." Pilots are not used on its switching engines, local freights and gravel trains.

#### NEW PUBLICATIONS.

*The Mechanics' Complete Library of Rules, Facts, Processes, etc., for the engineer, artisan, electrician, etc.* By Thos. F. Edison, A. M., and Chas. J. Westinghouse. Published by Laird & Lee, Chicago, Ill. Price \$1.50 cloth, \$1 paper.

The book contains some 550 pages of matter, and is a compilation of notes, rules, information, formulae, etc., apparently from reliable sources, some item or portion of which is every day found necessary to the engineer or mechanic in the successful practice of his calling. The table of contents alone takes up 20 pages of the book, hence it would be impossible for us to attempt to give

in detail the matter touched upon. It is of the usual pocket form and size.

*Electricity in Daily Life. A Popular Account of the Application of Electricity to Every-day Uses.* Pages 288, with 125 illustrations. Charles Scribner's Sons, New York. 1890. Price \$3.

The popular and very successful series of articles on railroads which was published in *Scribner's Magazine* was some time ago collected into a very handsome volume under the title of the "American Railway," and this volume has now become well known to many of our readers. Those papers were followed by a series of papers on Electricity in Daily Life, written, as were the railroad papers, by specialists. Those articles are now collected under the above title. The series includes papers by 10 different writers, all of whom are well known as experts in various departments of electrical science. Among the papers may be mentioned the Electric Motor, by F. L. Pope; the Electric Railway, by Joseph Wetzler, and Electric Lighting, by Henry Morton.

#### TECHNICAL.

##### Manufacturing and Business.

The National Paint Works, Williamsport, Pa., reports large sales of asphaltum paints. The paint has been used on the following large structures: Merchants' Terminal & Elevated Railroad, St. Louis, built by the Phoenix Iron Co.; the Philadelphia & Reading Terminal Bridge at Harrisburg, Pa., 4,400 ft. long, built by the Cofrode & Saylor Co., and Orrien Bros., circus and amphitheatre, in the City of Mexico, built by the Riverside Bridge & Iron Works, of Paterson, N. J.

The Richmond Standard Spike Works Co., of Richmond, Va., has bought the Iron Gate Rolling Mill, of Iron Gate, Va., and will enlarge the plant and add a spike mill.

The Waddell Travelers' Head-rest Co. has been formed at Gordonsville, Va., to manufacture the Waddell patent head-rest.

J. D. Tanner, J. T. Smite and others are organizing at Lynchburg, Va., a company for the manufacture of the Smite Non-Freezing Tank for locomotives.

The Safety Car-heating & Lighting Co., of New York, it is stated, will erect in connection with the Chattanooga Gas Light Co., a plant at Chattanooga, Tenn., for the manufacture of Pintsch gas.

The Pennsylvania Foundry & Machine Co., of Pittsburgh, will soon be chartered by Theodore Doerflinger, George P. Lesche, William J. Woods, F. C. Miller, Morton Hunter and John M. Griffin. The foundry will be located in Pittsburgh.

The Dougherty Freight & Grain Car Door Co., of Quincy, Ill., has been incorporated to manufacture freight and grain car doors. The stock, \$60,000; incorporators, George E. Dougherty, John T. Smith and Samuel H. Whittitt.

The Alabama Pipe Company has commenced the erection of its pipe works at Bessemer, Ala.

The Buda Foundry & Mfg. Co. has awarded contracts for the erection of its new plant at Harvey, near Chicago. There will be eight buildings in all, the largest of which are described as follows: Wood shop, 250 x 60 ft.; machine shop, 150 x 60 ft.; smith shop, 150 x 60 ft. The works are at present located at Buda, Ill., where the company manufactures hand and push cars, switch stands and other railroad supplies.

##### Iron and Steel.

The Princess Iron Co., Glen Wilton, Va., will build a rolling mill, and is now increasing the capacity of the Princess iron furnace.

The Bethlehem Iron Co., as previously announced, has this week voted to increase its capital from \$3,000,000 to \$5,000,000. The new capital is for the purpose of providing the plant necessary for making armor plates and other steel work for the government.

The Bessemer steel mill at Duquesne, Pa., recently purchased from the Allegheny Bessemer Steel Co., by Carnegie Bros. & Co., Ltd., and which was shut down while the legal transfer was being made, started up last week under the new management. For the present the output will be steel billets.

##### More Locomotives for New South Wales.

We have recently noted the order for a lot of 10-wheelers to go to New South Wales from the Baldwin Works. Others, 10-wheelers, quite similar in dimensions to the Baldwin engines, have been ordered from England. The English engines are expected to arrive in that colony in July, and then there will be fun among the rival interests.

##### New Car and Machine Shops.

The company which proposes to erect car works at Beaumont, Tex., has elected the following officers: W. A. Fletcher, President; V. B. Stinson, Vice-President; Valentine Weiss, Treasurer; H. W. Greer, Secretary; H. F. Moulton, Superintendent; D. S. Stinson, Mechanical Superintendent and Master Carpenter. The main building will be 490 x 70 ft., and the machine shops and wood-working building 150 x 70 ft. The capacity of the works will be 25 cars per diem. The National Rolling Stock & Street Car Co., of Boston, is interested in the works.

The Chicago, St. Paul, Minneapolis & Omaha has just completed three brick and stone round houses fitted with iron turntables and steam heating apparatus; one of 25 stalls at St. James, Minn.; one of 23 stalls at Sioux City, and one of 10 stalls at Minneapolis.

The St. Louis, Arkansas & Texas is said to contemplate the erection of machine shops and round house at Fort Worth, Tex.

The Richmond & Petersburg, it is stated, will erect new machine shops and a round house at Manchester, Va.

The Nashville, Chattanooga & St. Louis has completed the construction of its machine shops at Nashville, Tenn., and is now putting in an electric light plant.

The Louisville, St. Louis & Texas is purchasing about \$5,000 worth of new machinery for its machine shops at Cloverport, Ky.

The Virginia Car Co., Glasgow, Va., has commenced the construction of an 80 x 905-ft. building for its steel car works.

##### Safety Chains on the Lehigh Valley.

The Lehigh Valley Railroad is equipping its passenger cars with safety chains of the dimensions adopted at the last convention of the Master Car Builders' Association.

##### Wood Preserving.

According to the *Revue Industrielle*, a new timber preservative has recently been brought out under the name of "carbolineum." It is obtained from carbolic acid, and is a greenish-brown liquid of about the same consistency as boiled linseed oil. It is preferably used while hot and is applied to wood like a paint. Excellent results are claimed to have been secured with it.

##### A Dynamometer Wanted.

The German Agricultural Society has offered a prize of 400 marks for the best form of dynamometer for measuring the resistances of freight cars. The prize is to be awarded on the report of a test commission in March, 1891, and the purchase of the apparatus for the society is contemplated. The resistances which the dynamometer must be capable of registering range from 550 to 5,500 lbs. The use of different springs is permissible. The competition will be open until Feb. 15, 1891. Communications should be addressed to the German Agricultural Society (Deutsche Landwirtschafts-Gesellschaft), Zimmerstrasse 8, Berlin, S. W., Germany.

##### Work on the Nicaragua Canal.

An addition to the plant of the North American Dredging & Improvement Co., which has the contract for dredging the harbor at the eastern terminus of the Nicaragua Canal, has been made during the last week by the arrival from the United States of a powerful suction dredge and two clappers, thus giving that company two dredges with which to carry on the work. There are now seven powerful dredges in the harbor, three of which will be at work by next week. Three lumber schooners with creosoted ties for the railroad, piles for the pier and wharf, and timber for putting up additional buildings, have been unloaded at Greytown during the last week, while a steamer that has brought 1,500 tons of coal is now nearly discharged. Progress on the railroad is rapid and of the 12 miles of track necessary to reach the "divide," or rock cut, 7 miles has been laid, and the grading over the entire distance is nearly completed.

##### The Kingston Dry Dock.

The Dominion Government has asked for tenders for supplying, erecting and completing in place a wrought iron caisson for the dry dock now in course of construction at Kingston, Ont.

##### The Pacific Cable Route.

Information has just been received at Ottawa of the second season's work of H. M. S. "Egeria," the man-of-war assigned to make a systematic examination of the bed of the Pacific Ocean, with the object of discovering the best route for a cable from Canada to Australia. Last year was spent between Auckland, New Zealand and the Fiji group. The deepest sounding obtained south of the equator was 4,530 fathoms. Unfortunately, the nature of the bottom at this great depth was lost through the wire parting when heaving in. Three islands of the Phoenix group were surveyed in sufficient detail to ascertain their suitability for landing a telegraph cable. The vessel is now further engaged with survey work.

#### THE SCRAP HEAP.

##### Notes.

The Georgia Railroad offices and freight house in Augusta, Ga., were burned last Tuesday. Loss, \$75,000.

A Chicago man has recovered from the Wabash road a verdict for \$30,000, on account of injuries, resulting in paralysis, received four years ago in an accident.

A Memphis railroad officer says that last year he obtained \$3,000 worth of advertising from the Memphis papers at a cost of only \$800 in transportation.

Special Agent Kretschmeyer, of the Interstate Commerce Commission, has been in Memphis and in Kansas City investigating railroad practices.

A general strike among the coal miners of Alabama has begun Dec. 1. A Birmingham dispatch estimates that 6,000 of the 8,000 miners in the state have left their work.

One hundred and fifty men employed in the Union Pacific machine shops at Omaha, were discharged Oct. 28 and similar reductions in force will be made at other shops along the line. The hours of labor will also be reduced from an hour to an hour and a half.

The Chesapeake & Ohio, Norfolk & Western, and the Huntington & Big Sandy, which join, will build a union station at Kenova, Wayne County, W. Va. The Chesapeake & Ohio, running east and west, will occupy the ground floor, and the Norfolk & Western, which crosses the former at a height of 20 ft., will occupy the second floor. It is estimated that the building will cost \$25,000.

A robber uncoupled the passenger coach from a mixed train on the St. Louis, Arkansas & Texas near Winona, Tex., on Monday night last, and before the trainmen made the discovery the robber had ordered the passengers to hold up their hands, while he pointed a pistol at each and demanded his money. One passenger was shot through the breast by the robber, and will probably die. The robber escaped.

Last week Baird Bros., sub-contractors under Ferris & Kaufman, of Pittsburgh, who have the contract for the construction for the two bridges over the Ohio River for the Wheeling Bridge Co. at Wheeling, W. Va., attached materials in the hands of the contractors to cover a bill for \$27,588 for work they have done on the bridges for which they claim they have not been paid. The work has not been stopped by the attachment, however.

##### Foreign Notes.

The municipal authorities of Brussels, Belgium, are considering the project for an elevated railroad.

The estimated cost of the proposed ship canal from Rouen to Paris is 135,000,000 francs. The canal is to be about 112 miles long and a little over 20 ft. deep. The duration of the passage from Rouen to Paris is placed at about 17 hours.

According to *La Lumière Electrique*, an electric arc lamp has recently been devised abroad in which the use of illuminating gas plays an important part. One of the electric carbons is perforated longitudinally and is held in a socket filled with loose asbestos. The illuminating gas is delivered into the socket, passes through the asbestos and perforated carbon, and issues at the starting point of the electric arc. The light produced is thus



due to the combined action of the two illuminating agents.

Paper pipes for gas and water supply have recently been turned out at Vienna, Austria. According to *Uhl's Wochenschrift*, the pipes are made by winding paper strips, first dipped in a bath of molten asphalt, around a wooden mandril. After cooling, the mandril is removed and the interior of the paper pipe is provided with a coating of a kind of enamel of secret composition. The outside of the pipes is coated with asphalt varnish and sprinkled with sand. It is claimed that a test has shown pipes made in this way to be capable of successfully resisting high pressures.

#### Syrian Railroads.

The construction of the railroad between Joppa and Jerusalem seems likely to become an accomplished fact, the second installment of the amount necessary to build the road having been received from Paris and deposited with bankers in Jerusalem. The company which has undertaken the construction of the road has three years in which to complete the work, but it is expected that the road will be finished fully a year before the required time has expired. The success of the proposed line between Acca and Damascus in Syria seems also to be assured; final plans are now ready for submission. The construction of the road is to be completed within two years from the approval of the plan. This line will run from Acca on the Mediterranean to Smejd, and from thence northeasterly along Lake Tiberias, following the Jordan to the lower end of Lake Merom, where it crosses the stream and continues in a northerly direction to Banias, and thence northeasterly to Damascus. The line will be about 116 miles in length.

#### Special Orders for Helping Engines.

The Prussian Minister of Public Works has ordered that hereafter, when a train starts out from a station with a helping engine which is to leave it before it reaches the next station, to the telegraphic notification of the departure of the train must be added the words, "with helper." If the helper is to return to the station from which it started out, when it arrives there that station must telegraph to the next station, "Helper here." If the helper is to follow the train which it leaves, which it can do only when there is a block signal station before the next station, then its arrival, as well as that of the train it was helping, must be signaled back. On every section of road there must be a general rule, made known to all employees concerned, whether a helper shall return or follow the train it was helping. Should special circumstance require that the decision should be made for each case whether it should return or follow, then the notification of the departure of the train must always add after "with helper," "which returns," or, "which follows," as the case may be.

#### The Chesapeake & Ohio Canal.

It is reported that the bond for \$600,000 required of the Chesapeake & Ohio Canal bondholders of 1844 for the repair and maintenance of the canal as a waterway has been signed by the trustees, with John B. McDonald, the railroad contractor, and Miss Mary Garrett, both of Baltimore, as sureties. Under the terms of the order upon which the bond is given the canal is required to be put in running order by May 1, 1891. Martin F. Morris, of Washington, and Mr. Shaw, of Baltimore, have been elected trustees to fill vacancies.

#### English Freight Cars.

In the course of a paper read before the Institution of Mechanical Engineers, of England, Mr. R. Jeffers, C.E., asserted that a comparison of the wagon constructed by George Stephenson to carry the water tank for his "Rocket" locomotive, in 1829, with the build of the wagons in use in England at present, would show that there has been no change in principle and but little in construction during the sixty years that have since elapsed. He asserts that "on the English railways during the past thirty years neither have the goods rates undergone any reduction, nor have the working expenses been lessened; so that the rates could be lowered and still yield fair profits." Mr. Jeffers advises the introduction of the American style of cars, or more particularly the tubular frame cars, of large capacity, and thinks that they could be generally filled with freight, as 72 per cent. of the freight traffic on English roads consists of coal and other minerals, which is a much larger proportion than on American lines. He argues that as there are about 1,000,000 wagons, with an average carrying capacity of seven tons each, now in use on the roads of the United Kingdom, requiring about 100,000 annually for renewals, costing £60 each, or a total of £6,000,000, the change could be effected without straining the finances of the companies, as only 24,000 Goodfellows and Cushman cars, costing £165 each, or £3,960,000 altogether, would be required to carry the same tonnage, effecting an annual saving of over £2,000,000, besides the advantages accruing for carrying heavy loads in light wagons as against carrying light loads in comparatively heavy wagons.

#### A Traveling Chapel.

The Baptists in the Northwest are to have a chapel on wheels, which is to travel all over the Northwest, carrying two missionaries. The chapel car is 60 ft. long and 10 ft. wide. At one end a space about 18 ft. long will be fitted up for living purposes. The remainder of the car will be fitted and furnished as a chapel. The car will run on the Northern Pacific and Wisconsin Central, and doubtless on other roads also. In the summer the car will be supplemented by a tent.

#### An End to all our Troubles.

SPRINGFIELD, Ill., Dec. 2.—Among the licenses for incorporation issued to-day was one to the American Railroad Traffic Association at Chicago, capital stock \$10,000,000, to establish and maintain a uniform system and schedule of passenger and freight rates and charges for and by railroad companies doing a general passenger and freight traffic business in the United States. The incorporators are George W. Cole, C. Potter Johnson and Ryo West.

#### 24-Hour Time in India.

Captain Streetfield, Military Secretary to Lord Lansdowne, Viceroy of India, has just forwarded to Mr. Sandford Fleming, C. M. G., Ottawa, a communication from the Director-General of Indian Railways, which states that the 24-hour notation is now in general use on all the railroads of Hindostan, the total mileage of which is between 16,000 and 17,000 miles. The system has been partially adopted on the railroads there for some time back, and wholly in connection with the business of the telegraph department. Satisfied with the advantages accruing from its use, on the representations of the Director-General of Railroads and the President of the railroad conferences, the new system has quite recently been universally adopted throughout the Indian Empire.

#### The New Union Station at St. Louis.

Dr. William Taussig, manager of the Terminal Railroad Association of St. Louis, has given the local newspapers an outline of the plans of his road for a new passenger station at St. Louis, to take the place of the present structure, which is badly crowded. The general plan was presented to the city government for approval last week, and it is proposed to begin work as soon as the consent of the city is obtained. Plans for the building itself have not yet been fully decided upon, but the general arrangements of tracks and buildings is published in considerable detail.

The location of the new station will be about half a mile west of the present station and on the ground bounded by Eighteenth, Market and Twentieth streets. A headhouse will be built and the tracks will lie at right angles to the main line of the Missouri Pacific road. All arriving trains will run past the Y, connecting with the station and be back-d in. It is proposed to construct a train shed about 450 ft. wide to contain 34 (2) tracks. The longer tracks (those in the middle) will be about 1,200 ft. long. Those at the outside will be about 500 ft. long, "ladder" tracks extending from the centre, at the outer end of the train shed, to each side. Underground galleries will be provided beneath the platforms, so that the trucking of baggage from the baggage rooms to the outer end of the train shed for loading into baggage cars will be carried on out of the way of passengers, elevators being provided at the baggage room and at the cars. The company has already expended about \$1,000,000 for real estate and a similar amount will probably be spent on the main building, thus making it one of the largest and finest stations in the country.

#### Sault Ste. Marie Water Power.

A company is being formed in England which proposes to utilize the enormous water power of Lake Superior and to construct extensive factories and mills in the vicinity of Sault Ste. Marie. The waters of Lake Superior fall at the Sault about 30 ft. to the level of Lake Huron, and the velocity has been recorded by Gen. Poe, of the United States service, as a little more than 90,000 cu. ft. a second. A Col. Hope, who is one of the projectors of the new company, calculates, after making measurements, that the actual velocity and volume of water is 122,000 ft. per second, equivalent to 236,000 h. p. He proposes to build a tail race five miles long on the Canadian side and a canal five miles long on the American side, and to construct dry docks on both sides, to be filled and emptied by gravitation. This will be a novelty. On the Canadian side all the principal works will be above the rapids, and on the American side below the rapids.

#### Chinese Laborers for Railroad Work.

An agent of the Tehuantepec Railroad Co. has arrived in San Francisco from China, where at Canton he contracted for 8,000 men to work on the railroad. They will be shipped to the field of labor as soon as they are required. Already 500 men have reached Salinas del Santa Cruz, on the Gulf of Tehuantepec, and are engaged on 280 miles of road running from that point to Coatzacoacoas, on the Gulf of Mexico.

#### Tonnage of the United States.

The forthcoming report of W. W. Bates, Commissioner of Navigation, will show that the documented tonnage of all American vessels is 4,421,497, and their number 23,467. This is a gain in tonnage of 117,022 over 1879. The steam tonnage has increased by 93,527 tons; the sailing tonnage by 10,235, and the unrigged tonnage by 13,250 tons. The total tonnage on the northern lakes, on June 30, 1890, was 1,630,064 tons; on the Atlantic Coast, 2,636,595; on the Pacific Coast, 428,392, and on the Western rivers, 294,446. Of the total documented tonnage 1,859,088 is steam. The total new tonnage of the year is 294,122, as against 231,134 tons for the year ending June 30 last, and only 95,453 tons built in 1889, in which year 64,458 tons were built on our entire seacoast, and 26,826 tons on the Great Lakes. For the year ending June 30 last the lakes are credited with 108,525, and the Atlantic and Gulf coasts with 156,755 tons. For the preceding two years the lake and seaboard constructions have been about equal, aggregating 208,183 tons for the lakes and 216,977 for the seaboard.

The insured tonnage on the lakes now stands as follows:

	No. of tons.	Net tons.	Value.
American.....	2,053	8,439	\$58,113,300
Canadian.....	647	132,971	3,989,130
Totals.....	2,700	979,460	\$62,102,430

The increase of American lake tonnage has been largely due to the ore carrying trade, which in mines, railroads, docks and vessels has called for an investment, as computed by the Hon. George H. Ely, of Cleveland, O., of over \$150,000,000.

#### LOCOMOTIVE BUILDING.

A report is circulated that the Great Northern will soon place orders for about 100 engines. Specifications were issued last October, as stated in these columns at the time, for new locomotives, but not for a definite number, and it is probable that no further action has been taken.

The New York, Lake Erie & Western is asking bids on 25 engines. The specifications are to be furnished by those companies making bids.

The order for four locomotives recently placed with the New York Locomotive Works by the Wheeling & Lake Erie has been increased to eight mogul engines.

The Cincinnati, Wabash & Michigan has contracted with the Brooks Locomotive Works for six locomotives, to be delivered by March 1, 1891.

The Cincinnati, Hamilton & Dayton has recently placed in service two mogul and two switching engines, and it is stated that in addition to these there are under contract eight freight and five passenger engines.

The Schenectady Locomotive Works have recently built a freight and a passenger locomotive for the Connecticut River road. The works have just sent to the Michigan Central a ten-wheel compound passenger locomotive very similar to the one of the same type built about a year ago, excepting that it weighs 135,000 lbs., 99,000 of which is on the drivers. The drivers are 74 in. diameter, cylinders 20 in. and 29 in. x 24 in.

#### CAR BUILDING.

It is stated that the freight cars ordered by the Philadelphia & Reading from the Pullman Car Co. will be divided as follows: 3,000 to be 30-ton coal cars, 1,000 gondola cars, 1,000 box or house cars and 50 stock cars. They will be built at the works at Pullman.

The Chicago & Alton and the Chicago, Burlington & Quincy are each reported in the market for passenger cars, the former for 30 and the latter for 50.

The Wheeling & Lake Erie will soon place orders for two passenger and three combination cars.

The Richmond & Petersburg is to build a number of 60 ft. postal cars, and orders for new freight equipment are under advisement.

The New York Central & Hudson River road has built at its West Albany shops five postal cars for the new fast mail trains. The bodies are of pearl color with a very light striping. The lettering is in gold leaf. The five cars are named Adrian, Toledo, Rochester, Albany, and Syracuse.

The Burlington & Missouri River road has had several passenger cars built at the Aurora shops. They have Forney and Scarritt reclining seats with adjustable head rest. A number of cars of similar design have been built at the Pullman works.

It is reported that the Montgomery Palace Stock Car Co. is to arrange to have 1,000 of its stock cars placed in the service of O. W. Allerton, of Platt County, Ill., for shipping cattle, and that orders for some of this new equipment will be awarded shortly.

#### BRIDGE BUILDING.

**Chappel Hill, Tex.**—A company is organizing to build a bridge across the Yegua River at Chappel Hill.

**Cincinnati.**—The County Engineer has reported the necessity of constructing several bridges in Colerain Township, and has been instructed to draw up specifications for the structure at once.

The County Commissioners and the City Board of Equalization will approve the specifications for the bridge over the Miami Canal at St. Bernard, on Carthage Pike, provided the Cincinnati Inclined Plane Railroad pay one-half the cost of the bridge.

**Covington, Ky.**—A company is being organized at Covington to construct a bridge over the Licking River at Tenth street.

**Hemstead, Tex.**—The Houston & Texas Central is building iron bridges to replace wooden structures spanning Cedar Creek, a few miles north of this town, and across Clear Creek, two and one-half miles south. Wooden bridges over creeks on the line of the Austin branch will also be replaced by iron structures. It is said that all the wooden bridges on the entire line will be replaced with iron ones as rapidly as possible.

**Houston, Tex.**—The contract for the construction of the Sabine street bridge has been transferred from the Pittsburgh Bridge Co. to the King Iron Bridge Mfg. Co., of Cleveland, O.

**Lawrence, Kan.**—The County Commissioners have authorized the County Clerk to advertise for bids for building two iron bridges in Grant Township. G. H. Morgan, of Lawrence, is Bridge Commissioner.

**Leon Junction, Tex.**—An iron bridge will probably be built across the Leon River at this place.

**Little Rock, Ark.**—A survey is being made at Little Rock for a proposed free bridge across the Arkansas River. Under the provisions of the charter granted some time ago the contract must be let before Jan. 30, 1891. The War Department requires a fixed span bridge. It is likely that the foot of Main street will be selected as the site. The bridge will cost between \$250,000 and \$300,000, and will be built by the county.

**Lynchburg, Va.**—The Garland Heights Improvement Co. has been organized at Lynchburg, and will build an iron bridge across Black Water Creek. R. H. F. Adams is President and C. Christian, Secretary.

**Meriden, Conn.**—It is proposed to erect two iron bridges in this city at an estimated cost of \$14,000.

**Minneapolis, Minn.**—Plans are being made by the engineering department of the Great Northern for the five highway crossing bridges in Minneapolis.

**Roanoke, Va.**—The Norfolk & Western has been awarded a contract at \$10,719, for the construction of the iron work of the overhead street bridges to be erected at Roanoke.

**Sycamore, O.**—Sealed proposals will be received at the office of the Board of Hamilton County Commissioners until Dec. 13 for a wrought iron bridge on the road from Cornell avenue to Hopeful Cemetery, Sycamore Township.

**Topeka, Kan.**—The board of County Commissioners have instructed the County Clerk to advertise for bids for building a steel wire suspension bridge across Kansas River on Quincy street, in Topeka, according to plans and specifications now on file. Bids to be received up to Jan. 8.

**York, Ont.**—The Dominion Government at Ottawa is calling for tenders for the construction and erection in place of the iron superstructure of the bridge now in course of construction across the Grand River at the Village of York, Haldimand County, according to plans and specifications to be seen at the Department of Public Works, Ottawa.

**Wallingford, Conn.**—The Selectmen have awarded the contract for the new bridge in Zalesville to the Berlin Bridge Co. at \$2,479. The bridge is to be 111 ft. in length.

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Columbus, Springfield & Cincinnati*, \$1 per share, payable Dec. 10.

*Little Miami*, \$1 per share, payable Dec. 15.

*Nashville & Decatur*, 3 per cent., in cash, payable Dec. 1.

*Old Colony*, \$3.50 per share, payable Jan. 1.

##### Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Addison & Pennsylvania*, annual, Addison, N. Y., Jan. 12.

*Albany & Poughkeepsie*, annual, Norfolk, Va., Jan. 20.

*Atlantic & Danville*, annual, Portsmouth, Va., Dec. 11.

*Boston & Lowell*, annual, Boston, Mass., Jan. 7.

*Boston & Maine*, annual, City Hall, Lawrence, Mass., Dec. 10.



Cleveland & Pittsburgh, annual, Cleveland, O., Jan. 7.  
Columbus, Hocking Valley & Toledo, annual, Columbus, O., Jan. 13.

Eastern (Mass.), annual, Boston, Mass., Dec. 10.  
East Tennessee, Virginia & Georgia, special, Knoxville, Tenn., Dec. 6.

Fort Worth & Denver City, annual, Fort Worth, Tex., Dec. 9.  
Housatonic, annual, Bridgeport, Conn., Dec. 16.

Kings County (Elevated), annual, Brooklyn, N. Y., Jan. 14.  
Lehigh Valley, annual, Philadelphia, Pa., Jan. 20.

Little Schuylkill, annual, 410 Walnut street, Philadelphia, Pa., Jan. 14.  
Mine Hill & Schuylkill Haven, annual, 119 South Fourth street, Philadelphia, Pa., Jan. 12.

Nesquehoning Valley, annual, 226 South Third street, Philadelphia, Pa., Jan. 12.  
New York, New Haven & Hartford, annual, New Haven, Conn., Dec. 17.

New York, Ontario & Western, annual, 18 Exchange place, New York City, Jan. 21.  
New York, Providence & Boston, annual, Room B, Butler Exchange Building, Providence, R. I., Dec. 10.

Norfolk & Western, annual, adjourned, Roanoke, Va., Dec. 15.  
North Pennsylvania, annual, Philadelphia, Pa., Jan. 12.

Norwich & Worcester, annual, Worcester, Mass., Jan. 14.  
Philadelphia & Reading, annual, Philadelphia, Pa., Jan. 12.

Philadelphia, Wilmington & Baltimore, annual, Wilmington, Del., Jan. 12.  
Pittsburgh & Lake Erie, annual, 77 Fourth avenue, Pittsburgh, Pa., Jan. 27.

Pittsburgh, McKeesport & Youghiogheny, annual, Pittsburgh, Pa., Jan. 20.  
Red River, Sabine & Western, annual, Fort Worth, Tex., Dec. 11.

Richmond & West Point Terminal, annual, Richmond, Va., Dec. 9.  
Rome, Watertown & Ogdensburg, annual, 96 Broadway, New York City, Dec. 20.

St. Louis, Vandalia & Terre Haute, annual, Greenville, Ill., Jan. 13.  
Terre Haute & Indianapolis, annual, Terre Haute, Ind., Jan. 5.

Terre Haute & Logansport, annual, Terre Haute, Ind., Jan. 5.  
Toledo & Ohio Central Extension, annual, Marietta, O., Jan. 12.

Ulster & Delaware, annual, Rondout, N. Y., Dec. 9.  
Virginia Midland, annual, Alexandria, Va., Dec. 17.

Wallkill Valley, annual, 5 Vanderbilt avenue, New York City, Dec. 10.  
Western & Atlantic, annual, Atlanta, Ga., Jan. 21.

Meetings and conventions of railroad associations and technical societies will be held as follows:  
The Southern & Southwestern Railway Club will hold its next meeting in Atlanta, Ga., Jan. 15.

The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The New York Railroad Club meets at its rooms in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The Central Railway Club meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The Northwest Railroad Club meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station at 7:30 p. m.

The Northwestern Track and Bridge Association meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at the American House, Boston, at 7:30 p. m., on the third Wednesday in each month.

The Western Society of Engineers holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The Engineers' Club of Kansas City meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The Engineering Association of the Southwest generally holds its meetings at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn. The next regular meeting will be held at Birmingham, Ala., Dec. 12.

The Denver Society of Civil Engineers and Architects holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers Association of Kansas holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m. The annual meeting will be held on the third Wednesday in December.

The American Society of Swedish Engineers holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

#### American Society of Civil Engineers.

The following nominations are announced by the Direction as having been regularly made. We print only the ticket of the Nominating Committee and the variations from it, and give the region from which each ticket comes, as nearly as can be given in a word:

##### Nominating Committee's Ticket.

President, Octave Chanute; Vice-Presidents, \*John Bogart, Charles Hermans; Secretary, John C. Trautwine, Jr.; Treasurer, \*George S. Greene, Jr.; Directors, \*Theodore Cooper, Rudolph Hering, Clemens Herschel, E. P. North, Samuel Whitney.

##### Boston Ticket.

Treasurer, \*Francis Collingwood; Director, Charles B. Brush.

##### Albany Ticket.

Vice-President, \*Charles B. Brush; Secretary, \*John Bogart; Treasurer, O. F. Nichols; Director, C. H. Myers.

##### New York Ticket.

Vice-President, Alphonse Fteley; Secretary, Francis Collingwood; Treasurer, John Bogart; Director, Charles B. Brush.

##### Philadelphia Ticket.

Vice-President, \*C. B. Brush; Secretary, Francis Collingwood; Treasurer, John Bogart; Director, C. H. Myers.

##### Pittsburgh Ticket.

Secretary, Francis Collingwood; Treasurer, \*C. B. Brush; Director, A. P. Boller.

##### Cincinnati Ticket.

Vice-President, Alphonse Fteley; Secretary, Francis Collingwood; Treasurer, W. H. White; Director, J. E. Childs.

##### St. Louis Ticket.

Vice-President, Walter Katté; Treasurer, A. P. Boller; Director, J. E. Childs.

\*Declines to run for this office.

At the meeting of Dec. 3 the following were elected:

##### Members.

George Henry Kimball, Chief Engineer Lake Shore & Michigan Southern Railway, Cleveland, O.; Horace Miller Marshall, Mississippi Levee Board, Vicksburg, Miss.; James Orange, member of firm Danby, Leigh & Orange, Hong Kong, China; William Abbot Pike, Professor of Engineering, University of Minnesota, Minneapolis, Minn.; Henry Martyn Rood, Assistant Engineer New York State Canals, Mechanicville, N. Y.; William Lucien Scaife, Chairman of the Scaife Foundry & Machine Co., Ltd., Pittsburgh, Pa.; George Colfax Smith, Chief Engineer Construction Western Railway of Uruguay, Montevideo, Uruguay, S. A.; Richard Watkins, engineer and surveyor, Sydney, Australia.

##### Juniors.

William Hobbs Chadbourne, Jr., Chief Engineer Wilmington, Chadbourne & Conway Railroad, Chadbourne, N. C.; Chandler Davis, Department of Docks, New York City; Charles Herbert Deans, Assistant to Superintendent in charge of building piers for Louisville & Jeffersonville Bridge, New York City; Archer Cochran Stites, Kansas City, Mo.

The paper of the evening was on Construction and Maintenance of Track, by Julian A. Hall. The paper was comprehensive in scope and quite elementary in treatment. The author's recommendations were nearly all in the line of well known and accepted practice. There was brief discussion by Mr. G. R. Hardy and Mr. R. L. Harris.

It was voted that the proposed amendments to the constitution and the report of the Committee be put in print and distributed before the annual meeting.

##### Engineers' Club of Philadelphia.

A regular meeting was held Nov. 15. President H. W. Spangler in the chair; 31 members and 7 visitors present. The secretary called attention to the question of contributions to the club subscription to the proposed Engineering Headquarters and Congress at the World's Fair in Chicago.

The Secretary presented, for Mr. R. Taylor Gleaves, of Lynchburg, Va., a description of Continuous Rails for Railroads, which are carried upon ordinary ties of wood or iron weighted down with a covering of earth, gravel, or stone, so that they cannot easily move. The spikes are not driven home by three-eighths of an inch, so that undulations may take place in the rail without disturbing either spikes or ties, and arrangements resembling turnouts are put in at fixed points, such as frogs, and at the foot of heavy grades, for the purpose of admitting of longitudinal motion.

The author explains how the rails are united so as to make them continuous. In the case he notes the rails were riveted together with fish plates. He says that while the riveting was in progress the expansion gave some trouble, but since it has been completed there has not been the slightest buckling or any perceptible pulling in on the curves. The ties are covered with red clay containing some loam, and, to prevent dust, part of the track was turfed and grass seed sown over the remainder, so that now he says, "instead of a wrench, the watchman pushes a mower, and the roadbed looks like a pretty green lawn with two metal ribbons laid across it."

Speaking of the doubts which had been expressed as to the utility of this arrangement, the author says that it is a fact "that there is in Virginia a section of track laid with rails three miles long, that it has been in service since June, 1889, that it has not been surfaced or lined since put down, that the only expense of maintaining it has been the watchman, that engines weighing 104,000 lbs. are frequently run over it at a speed of 50 miles per hour, that it is simply ballasted with earth, and that he will take pleasure in showing it to any who cares to investigate."

##### New England Railroad Club.

The regular meeting of the Club will be held at the United States Hotel, Boston, Wednesday, Dec. 10, at 7:30 p. m. The subject for discussion is: "The Best Form and Application of Brakes to Driving Wheels of Locomotives." Mr. L. M. Butler, of the New York, Providence & Boston, will open the discussion. At the last executive meeting the committee resolved that parties wishing to present any form of driving brake shall do so by preparing a paper to be read at the meeting.

##### New York Railroad Club.

The next regular meeting of the New York Railroad Club will be held on Thursday, December 18, at 2 o'clock in the club rooms in the Gilsey House, New York City.

Mr. R. A. Parke will present a paper on the subject of Brake Rigging, pointing out particularly the lack of efficiency in the operation of the air brake due to defective foundation rigging and to want of proper care in maintenance.

##### The Connecticut Engineers and Surveyors.

About 25 members were present at the meeting of the Connecticut Association of Civil Engineers and Surveyors at East Berlin, Conn., last Saturday. The first business of the meeting was the discussion of the report, made at the August meeting, of the special committee on dams legislation. City Surveyor C. H. Bunce, of Hartford, read a paper on "Asphalt Paving," and C. M. Jarvis, President of the Berlin Bridge Co., gave an address on bridge construction. E. O. Goss, of Waterbury, and W. E. Johnson, of Glastonbury, were elected members. The meeting then adjourned till the annual meeting, which will be held in Hartford on Jan. 13.

##### The Technical Conventions.

The committee appointed by the Master Car Builders' and Master Mechanics' Associations at the convention at Old Point Comfort last July, held a meeting in Buffalo, Nov. 25. The committee decided to recommend that the conventions be held in New York City, instead of at Cape May, N. J., and the executive committees of both associations have agreed to hold the meetings in New York City. It is proposed that the convention of the Car Builders' Association begin on the second Wednesday in June, and that of the Master Mechanics' on the following Monday.

##### Western Railway Club.

The subject for discussion at the December meeting will be Mr. Schroyer's paper on "Draft Rigging." Mr. D. L. Barnes will read a paper on "Air Brakes and Vertical Plane Couplers in Service for Freight and Passenger Trains."

##### Western Society of Engineers.

A meeting of the Western Society of Engineers was held Wednesday evening, Dec. 3, at 8 o'clock. Reports of Committees on Nomination of Officers for 1891 and Annual Meeting were submitted.

The subject for the evening was an explanation of Dr. de Bausset's Air Ship, by Mr. Otis K. Stuart.

#### PERSONAL.

—Mr. Wolcott C. Foster, of New York, has been appointed Chief Engineer of the extension of the Tarrytown Water Works.

—Mr. W. L. Tracy, Division Master Mechanic of the Central of Georgia at Macon, Ga., has resigned to accept a position on another road.

—Mr. G. W. Ettinger, lately General Manager of the Iron Car Co., has become associated with the Charles Scott Spring Co., of Philadelphia.

—Mr. H. P. Latta, General Master Mechanic of the Chicago & Erie, with headquarters at Lima, O., has resigned that position. His successor has not yet been appointed.

—Judge Cooley, of the Interstate Commerce Commission, began a course of lectures before the Yale Law School at New Haven, Conn., this week on the Interstate Commerce act.

—Mr. N. A. Willcox has been appointed General Freight Agent of the New York, New Haven & Hartford, to succeed the late Charles Rockwell. Mr. Willcox has been Assistant General Freight Agent for a number of years.

—Mr. Geo. G. Bagley, of Rutland, has been appointed State Railroad Commissioner of Vermont by Governor Page. Mr. Bagley was manager of the Western Union Telegraph Co.'s office at St. Johnsbury for 10 years. He has for a long time been a Manager of the New England Insurance Co. Mr. Bagley is about 35 years old.

—Mr. C. B. Street, Master Mechanic of the Pittsburgh, Cincinnati & St. Louis, died on Saturday last at 9:30 a. m. of heart failure, at Dennison, O. He was 52 years old and had been Master Mechanic in the Pennsylvania service for the last 17 years, and during that time made many friends. After serving his time at Altoona Mr. Street was appointed Master Mechanic of the West Pennsylvania division of the Pennsylvania at Pottsville, Pa., and Master Mechanic at Dennison in 1882. He was a member of the American Master Mechanics' Association, and a brother-in-law of Robert Pitcairn, Superintendent of the Pennsylvania division of the Pennsylvania Railroad. Mr. S. P. Bush has been appointed Acting Master Mechanic at Dennison.

#### ELECTIONS AND APPOINTMENTS.

Boston, Revere Beach & Lynn.—At a meeting of the directors at Boston, Mass., Nov. 26, M. Shepard Bolles was elected President in place of J. P. T. Edmonds; John A. Fenno was re-elected Treasurer, and C. A. Hammond Superintendent.

Boston, Winthrop & Shore.—At the annual meeting, held at Boston, Mass., Nov. 26, the following directors were elected: Matthew Bolles, Edward Tyler, A. F. Breed, James Tirrell, M. O. Adams, G. S. Ricker, G. B. Upton, and M. Shepard Bolles. M. Shepard Bolles was elected President, J. A. Fenno Treasurer, and C. A. Hammond Superintendent.

Central Railroad & Banking Co. of Georgia.—The office of Superintendent of the Southwestern Division will hereafter be located at Smithville, Ga. After that date all communications for the Superintendent should be addressed to that point, instead of at Macon.

Chicago, Milwaukee & St. Paul.—At his own request and on account of physical infirmity, A. V. H. Carpenter has been relieved of the charge of the Passenger Department of this road, after 30 years of service. He will hereafter act in an advisory capacity in passenger traffic affairs. George H. Heaford has been appointed General Passenger and Ticket Agent.

Chicago, Rock Island & Pacific.—J. C. Coombs, having resigned the position of Assistant Superintendent of the Des Moines Valley division, that office has been abolished.

Decatur, Chesapeake & New Orleans.—W. L. Frierson, of Shelbyville, Tenn., has been appointed Receiver of this road.

Delaware & Osego.—Samuel A. Andrews, of South Kortright, N. Y., has been elected President of the company in place of Thomas Cornell, deceased.



**Eastern Minnesota.**—W. S. Alexander has been appointed Vice-President and General Manager of this road with headquarters at St. Paul, Minn.

**Gainesville, Oklahoma & Gulf.**—The incorporators of this company and of the Gainesville, McAllister & St. Louis are: George Y. Bird, R. D. Gribble, H. B. Fletcher, C. Blackwood, C. N. Stevens, W. M. Hudson, Walter S. Hurley, J. M. Lindsay, W. L. Pierce, Phillip Lewin, D. L. Painter and John L. Simpson.

**Georgetown, Granger & Western.**—The following directors have been elected: Capt. Emsy Taylor, G. W. Glascock, W. K. Makemson, John H. Leavell and T. B. Cochran of Georgetown, Tex., and Capt. J. M. Denson and Dr. J. C. Anderson of Granger, Tex. Capt. E. Taylor was elected President and J. M. Denson Vice-President.

**Great Salt Lake & Hot Springs.**—This new Utah company has elected the following directors: John Beck, T. W. Jennings, S. Bamberger, C. E. Pearson, A. L. Williams, J. W. Neff and G. D. Amos. The directors elected these officers: S. Bamberger, President; John Beck, Vice-President; A. L. Williams, Second Vice-President; A. E. Hyde, Treasurer; and H. P. Folsom, Secretary.

**Harrisburg & Bedford.**—Thomas B. Kennedy, of Chambersburg, Pa., is President of this company, chartered in Pennsylvania last week. The other directors are: W. W. Jennings, Harrisburg, Pa.; J. N. DuBarry, Henry D. Welsh and W. H. Barnes, Philadelphia, Pa.; J. Herman Bosler and Edward B. Watts, Carlisle, Pa.; N. P. Shortbridge, Wynnewood, Pa., and M. C. Kennedy, Chambersburg, Pa.

**Lehigh & Hudson River.**—At the annual meeting of the stockholders, at 80 Broadway, New York City, Dec. 1, these directors were elected: Joseph S. Harris, E. W. Clarke, Edmund Lewis, Grinnell Burt, Thomas Martin, G. W. Sanford, J. R. Maxwell, Austin Corbin, G. F. Baker, G. A. Hobart, E. D. Adams, W. R. Potts and Charles Caldwell. The following officers were elected: President and General Manager, Grinnell Burt; Vice-President, Joseph S. Harris; Treasurer, John Sayer, and Secretary, D. B. Halstead.

**Macon & Atlantic.**—J. W. Palmer, of Macon, Ga., has been appointed Resident Engineer of the east end of the road. Mr. Palmer was formerly Assistant Engineer of this company and of the Macon & Birmingham road.

**Mexican National.**—Andrew Anderson, Jr., has been appointed Purchasing Agent of this company, to fill the position made vacant by the death of George Bernard.

**Middletown & Crawford.**—At a meeting of the company held at No. 21 Cortlandt street, New York, Dec. 2 the following named directors were elected: Albert Bull, R. M. Crosby, John King, William L. Strong, E. B. Thomas, A. R. Macdonough and Andrew Donaldson.

**Minneapolis, St. Paul & Sault Ste. Marie.**—The office of A. L. Fulemow, General Eastern Passenger Agent of the line, has been removed from Boston, Mass., to No. 353 Broadway, New York City. George I. Humphrey has been appointed traveling passenger agent, with office at No. 211 Washington street, Boston.

**Mobile & Montgomery.**—At the annual meeting of the road at Montgomery, Ala., Nov. 29, the old Board of Directors was re-elected as follows: M. H. Smith, G. W. Craik, A. C. Danner, J. F. Whitfield, Thos. G. Jones, J. I. McKinney, J. B. Thompson and Theo. Welch. The directors elected the following officers: G. W. Craik, President; M. H. Smith, Vice-President; J. H. Ellis, Secretary.

**Mobile & Western.**—The incorporators are: John H. Turner and H. G. Ruffin, Jr., Mobile; H. Merigold, Lima, Ohio; Archibald McDonald, St. Paul, Minn.; D. H. Campbell, Anniston, Ala.; A. Nesbitt Turnbull, Baltimore, and Elmo Christman, Minneapolis.

**New York, Lake Erie & Western.**—E. B. Thomas, who has been elected First Vice-President of this company, to succeed S. M. Felton, Jr., who has resigned to take charge of another property, assumed the duties of the position, Dec. 1.

**New York & New England.**—R. W. Eavenson, formerly Superintendent of the Eastern division, has been appointed Superintendent of Transportation for the whole road. C. N. Chevalier has been transferred to succeed R. W. Eavenson, as Superintendent of the eastern division, and D. N. Nichols, formerly General Superintendent of the St. Louis & San Francisco, becomes Superintendent of the Western and Springfield divisions, with headquarters at Hartford, Conn.

**New York, New Haven & Hartford.**—N. A. Willcox has been appointed General Freight Agent, with office at New Haven, Conn.

**Oil Valley.**—The following are the first board of directors of this company: C. A. Weed and Waring S. Weed, of Binghamton, N. Y.; Saphrona A. Mundy and William J. Oathout, Braford, Pa.; Wm. M. Hunter, Randolph, N. Y.; Herman F. Mundy and H. F. Mundy, Jr., Watonsville, Pa. C. A. Weed is President.

**Oregon Improvement Co.**—E. Lyons has been appointed Assistant Superintendent of the Columbia & Puget Sound road, with headquarters at Seattle, Wash., vice B. T. Carr, resigned. G. J. McCabe has been appointed Assistant Superintendent of the Seattle & Northern, with headquarters at Anacortes, vice H. F. Nichols, transferred to be Assistant Superintendent of the Olympia branch of the Port Townsend Southern road, with headquarters at Olympia, vice C. C. Jacob, resigned.

**Parkersburg Branch.**—Orland Smith was re-elected President, and Robert Garrett, D. H. Miller, W. F. Burns, W. W. Taylor and W. H. Blackford, of Baltimore; J. N. Camden, W. N. Chancellor and C. H. Shattuck, of Parkersburg; D. C. Winebrenner, of Frederick, Md., and Thomas S. Spates, of Clarksburg, were elected directors at the annual meeting recently held at Parkersburg, W. Va.

**Philadelphia & Reading.**—J. G. Thomas has been appointed Superintendent of the company held at Youngstown, Ohio, Dec. 2, the following directors were elected: C. H. Andrews, L. E. Cochran, Youngstown; W. W. Peabody, Orland Smith, Cincinnati; H. W. Oliver, William McCreery, C. S. Wright, J. S. McCleaves, Pittsburgh; David Lee, Zanesville; R. F. Devries, Newark; T. M. King, Philadelphia; J. H. Collins, Cleveland, Or-

land Smith was elected President and J. B. Washington Secretary and Treasurer.

**Pittsburgh & Connellsville.**—The following were elected as directors for the ensuing year at the annual meeting held at Pittsburgh, Pa., Dec. 1: Orland Smith, Cincinnati, O.; Robert Garrett, Mendes Cohen, Chas. Webb, Findley H. Burns, Baltimore, Md.; John D. Scully, Geo. A. Berry, Wm. Metcalf, W. J. Moorhead, Pittsburgh; John W. Chalfant and C. A. Fitzhugh, Allegheny; W. H. Koontz, Somerset. The officers elected were: President, Orland Smith; Secretary, Treasurer and Auditor, J. B. Washington.

**Portland and Rumfield Falls.**—The following are the directors of this Maine road: Hugh J. Chisholm, Waldo Pettigill, D. F. Emery, Jr., George C. Wing, and George D. Bisbee.

**Providence & Springfield.**—These directors were elected at the annual meeting this week: William Tinkham, William H. Pope, Horace A. Kimball, Benjamin F. Vaughn, Albert L. Sayles, Mortimer H. Hartwell, Charles Howard, Sidney Dillon and Joshua Wilbour. The directors chose the following officers: President, William Tinkham; Treasurer, F. W. Tinkham; General Agent, F. F. Arnold; General Manager, Charles Howard; Superintendent, L. W. Palmer.

**St. Louis & Lake Superior.**—The officers of the company are: President, N. J. Upham; Secretary, A. C. Otis; Treasurer, J. D. Stryker; General Manager, H. M. Wamsley, and Chief Engineer, C. E. Bussell. The office is in the Hapman Building, Duluth, Minn.

**Sandy River.**—The following officers and directors were elected at the last annual meeting at Phillips, Me.: President and Superintendent, N. B. Beal, Phillips; Clerk, Daniel M. Bonney, Farmington; Treasurer and General Ticket Agent, J. E. Thompson, Phillips. Directors: N. B. Beal and Joel Wilbur, Phillips; Daniel M. Bonney and James H. Bonney, Farmington; W. D. Sewall, Bath.

**San Domingo Central.**—The stockholders of the company, at their annual meeting in New York, Dec. 2, chose the following directors: Horatio C. King, H. L. Bean, S. S. Ward, P. P. Harris, H. H. Bibby, Milton Griswold, H. H. Alden, C. E. Wilson and A. W. Foulen.

**Savannah, Americus & Montgomery.**—William Argue, recently foreman of the East Birmingham Iron & Foundry Co.'s shops, has gone to Americus, Ga., to accept the position of Master Mechanic of the road, recently tendered him.

**Savannah, Florida & Western.**—The Purchasing Department of the Savannah, Florida & Western Railroad is now known as the Purchasing Department of the Plant System, and C. O. Haines has been appointed Purchasing Agent of the system.

**Southern Central.**—The company has been incorporated by C. W. McKeegan, of Philadelphia; W. Ross McPherson and Alexander Paterson, Clearfield, Pa.; Joseph L. Tull, Philadelphia; Henry E. Davis and George H. Neff, Sunbury, Pa., and William C. McConnell, Shamokin, Pa.

**South & North Alabama.**—The stockholders of the road met at Montgomery, Ala., Nov. 29, and elected the following Board of Directors: F. M. Billings, W. L. Chambers, H. F. De Bardeleben, J. W. Durr, E. B. Joseph, Bolling Hall, M. P. LeGrand, Jno. T. Milner, Josiah Morris, J. C. Orr, A. M. Quarrier, M. H. Smith, L. M. Falk. The directors elected the following officers: H. F. DeBardeleben, President, and G. W. Craik, Secretary and Treasurer.

**Staten Island Midland.**—The directors of the company are Joseph M. Tuttle, William O. Ross, Frederick J. Reville, Frank O. Ayres and Henry B. Johnson, of New York, and Edward E. Britton, W. K. Van Bokkenlen and Walter C. Low, of Brooklyn, N. Y.

**Union Pacific.**—At a special meeting in Boston, Nov. 26, the resignations of Charles F. Adams, John P. Spaulding, James A. Rumrill and Samuel Carr, Jr., were accepted, and Jay Gould, Russell Sage, H. B. Hyde and A. E. Orr were elected directors and took seats in the Board. Mr. Sidney Dillon, already a director, was elected President. The directors elected Messrs. Gould and Sage to the Executive Committee in place of Messrs. Adams and Rumrill; Messrs. Hyde and Orr to the Financial Committee, and Mr. Gould to the Committee on Connecting Roads, in place of Mr. Adams.

**Utah Midland.**—The annual meeting was held at the Walker House, Salt Lake City, Utah, Nov. 25, and the following directors elected: J. J. Haggerman, Colorado Springs; H. T. Rogers, H. Colbran and C. E. Noble, Denver; W. S. McCormick and F. H. Auerbach, Salt Lake City. The directors elected J. J. Haggerman President, W. S. McCormick Vice-President, H. T. Rogers, Treasurer, and C. E. Noble Secretary.

**Western North Carolina.**—The directors re-elected at the annual meeting held at Asheville, N. C., Nov. 26, were: J. A. Rutherford, W. G. Oakman, J. H. Parker, New York; C. S. Brice, Ohio; A. B. Andrews, Raleigh; S. P. Wiley, Salisbury; J. E. Rankin, Frank Cox, Asheville, and J. W. Cooper, Murphy, N. C. The following officers were re-elected: President, A. B. Andrews; Vice-President, Frank Cox; Secretary and Treasurer, George P. Irwin, Morganton.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Albany, Florida & Northern.**—The progress of the tracklaying on the first section of this road from Albany northeast to Cordele, Ga., has been delayed somewhat by a temporary scarcity of labor. The work, however, is again progressing satisfactorily, and it is expected that the road will be ready for operation for the first 35 miles during the latter part of the present month.

**Alta.**—This company has been formed for the purpose of constructing a road from the mine of the Alta Coal Co., in Sections 35 and 36, T. 22 north, Range 7 east, to points as yet undetermined. The office of the company will be in Tacoma, Wash. The capital stock is \$100,000. John H. McGraw and John S. Anderson, of Seattle, and Edward Sikes, of San Francisco, are directors.

**Bracebridge Colonization.**—This company, incorporated last February, is applying to the Ontario Legislature for an amended charter, giving power to construct a road from Bracebridge, in the District of Muskoka, on the Grand Trunk, thence northwest through the township of Macaulay to the village of Baysville, in the township of McLean. The distance is about 11 miles.

**Briarfield, Blockton & Birmingham.**—The caving in of several large cuts on the Bessemer division has caused the tracklaying to be suspended for a short time. Only four miles of rails need to be laid to connect the ends of the track, which has been laid from both Gurnee Junction and Bessemer, Ala. The distance of 22 miles and the entire road will be ready for operation before the end of the month.

**Bristol, Elizabethton & North Carolina.**—The tracklaying has made considerable progress on the section of this road between Bristol and Elizabethton, N. C., 22 miles. The grading has been finished between these points and is now in progress toward Mountain City, 60 miles from Bristol. Altogether about 1,000 men are reported at work on the grading and tracklaying and other construction work. It is expected that it will be in operation for the entire distance by next July. The Unaka Construction Co., of 224 South Fourth street, Philadelphia, has the contract. The road begins at Bristol and extends southwest along the Beaver Creek for eight miles and thence south, crossing the Holston River at Bluff City, following Indian Creek for six miles and thence across the Watauga River, at Elizabethton. From that point it extends easterly for 22 miles to the mouth of Roan Creek and along the base of Doe Mountain for 18 miles. A number of steel and rolling mills and other manufacturing establishments are projected to be erected along the route of the road in a few months, and a large traffic is expected from their output and in carrying ores and other supplies.

**Calgary & Edmonton.**—The locating survey from Calgary to Edmonton, N. W. T., a distance of 190 miles, was completed recently, and the surveys are being made for the bridges on the northern part of the line. About 110 miles of grading is at present finished north of Calgary and track has been laid for about 93 miles to near the Red River. When the line is completed to Edmonton it is to be extended south to the Old Man River near McLeod, N. W. T., a distance of 110 miles from Calgary. No work has been done on this latter line, however, except the surveys. James Ross & Co., of Montreal, have the contract.

**Cape Breton.**—The eastern section of the road between the Grand Narrows of the Bras d'Or lakes and Sydney was formerly opened for passenger traffic Nov. 24. The western section between the Narrows and Hawksbury, on the strait of Canso, will be opened next month.

**Chesapeake & Ohio.**—D. Shanahan & Co., of Louisville, Ky., who have the contract for building the road from the Chesapeake & Ohio line to the mines of the Ritch Patch Iron Co., near Lowmoor, Allegheny County, Va., have completed the first four miles from the connection with the railroad, and expect to have the last two miles finished before January.

**Chicago, Rock Island & Pacific.**—All the track on the extension from South Omaha southwest to Lincoln, Neb., has been completed with the exception of a few miles within the town limits of Lincoln, where the company has had considerable trouble to secure right of way for an entrance and the station grounds. The new line is 54 miles long.

**Chicago, St. Paul, Minneapolis & Omaha.**—The straightening of the main line to Chicago, through Wisconsin, is nearly finished. The line from Woodsville to Baldwin, Wis., was completed last Tuesday, and the branch from Neillsville to Marshfield, 32 miles, was completed Dec. 1.

**Cleveland Belt.**—With favorable weather it is expected that the grading will be completed and that the line will be ready for tracklaying in a few weeks from the connection with the Cleveland Canton tracks at Cleveland, O., to the connection with those of the Lake Shore & Michigan Southern in the opposite part of the city. The present line will be about seven miles long, but it is proposed to continue it easterly next spring. Rails have been ordered for the section on which the grading is now in progress.

**Corpus Christi & South America.**—The contract for the construction of this entire line, including the grading, track-laying and bridging, has been let to Griffith Bros., as already stated. The firm has now some 70 teams and 150 men at work. Five miles of the grading has been completed at the Corpus Christi end of the line and two miles at the Brownsville end. A number of preliminary surveys have been made and the line finally located between Corpus Christi and Brownsville, Tex., 160 miles. The route is from Corpus Christi, Nueces County, via Laureles and Kings Ranch, in the same county, to Roosevelt, in Cameron County. Roosevelt is the largest town on the line, situated in a good farming country, just half way between Corpus Christi and Brownsville. From this point a branch line will be built to Rio Grande City, in Starr County. From Roosevelt to Brownsville there are no important towns, the line running through large ranches and farms until the Rio Grande River is reached. There will be considerable trestling on the line. All the timber for the road has been ordered from the Beaumont mills, Beaumont, Tex. Bonuses and land donations to the amount of \$500,000 have been secured by the company. President E. H. Ropes and General Manager J. B. Armstrong are now in New York, negotiating for the purchase of steel rails, rolling stock, etc.

**Fairhaven & Southern.**—It is expected that the road will be completed to a connection with the Canadian Pacific near New Westminster, B. C., before Dec. 30. The rails have been laid from Fairhaven north along Puget Sound to the town of Blaine, Wash., which is a few miles this side of the international boundary line. The distance between the two points is 24 miles. The entire line to New Westminster will be about 50 miles long. A branch has been built from Sedro to coal mines about eight miles distant. It is proposed to build a line next year from Sedro to Sauk, Wash., 30 miles, and also from Ferndale to Lynden, eight miles.

**Findlay, Fort Wayne & Western.**—The company has commenced to erect the bridges between Ottawa and Fort Wayne, Ind., and if they can be completed this winter it is probable that track will be laid immediately between the two points. The distance is about 60 miles, and the grading was done by the American Midland Railroad, and before the present company had taken possession of the road. There are three bridges to be built, the principal one being across the Blanchard River.

**Gainesville, McAllister & St. Louis.**—This is one of the roads projected by the Board of Trade of Gainesville, Tex., and referred to last week. The charter,



which will soon be filed, will describe a road from Gainesville northeast to Red River at a point between the mouth of Hickory creek and the lower end of Delaware bend, a distance of 30 miles from Gainesville. The second road is the Gainesville, Oklahoma & Gulf.

**Gainesville, Oklahoma & Gulf.**—This company has been organized at Gainesville, Tex., to build a road from that point in a northwesterly direction to Red River at some point between the northern part of Devil's bend and the northwest corner of Cooke county.

**Georgetown, Granger & Austin.**—This company has filed articles of incorporation at Austin and proposes to build a road from Georgetown east to Granger, Tex., about 20 miles. A preliminary survey is being made by John O'Neil, of Ballinger, Tex. It is expected that the cost of the construction will be raised by subscriptions from the two towns directly interested.

**Georgia, Carolina & Northern.**—The track has been finished from Abbeville, S. C., to a point beyond Little River, which is about 10 miles west of that town, and about 15 miles north of the Savannah River. The work will probably be finished to the Savannah River during the present week. Trains are now running to Greenwood, S. C.

**Georgia, Midland & Gulf.**—The survey for the extension of this road from McDonough northerly to Atlanta, Ga., a distance of 28 miles, was completed this week. Several other surveys have been made within the past few months. The location, however, has not yet been made and this may be postponed, but it is probable that the same engineering party will begin work on that survey very shortly. If this is done the contract for the grading will probably be let about March 1. The company is ready to let the work as soon as the locating survey has been made. The work is medium and is mostly earth excavation. On some sections there will be a little heavy rock work. There are no important trestles or other important engineering structures.

**Haines, Hamilton & Kingston.**—This road was formally opened Nov. 29 with much ceremony. The road begins at Hamilton, where it connects with the Hannibal & St. Joseph road, and extends northwest to Kingston, the county seat of Caldwell County, Mo., a distance of eight miles.

**Harrisburg & Bedford.**—This company was incorporated in Pennsylvania Dec. 1, 1890. The road is to extend from a point on the Cumberland Valley road at or near Shippensburg through the counties of Cumberland, Franklin, Fulton and Bedford to a point on the Bedford & Bridgeport Railroad at or near Mt. Dallas, Pa. The length of road is about 60 miles. The capital stock is \$2,500,000. Thomas B. Kennedy, Chambersburg, Pa., is President.

**Huntington & Big Sandy.**—The company expects to have trains running on its road between Huntington and Keosauqua, W. Va., where it connects with the Norfolk & Western, by Jan. 15 next. It will not be able to complete the bridge over Twelve Pole River, however, until next spring.

**Kennebec Central.**—The directors have petitioned the state Railroad Commissioners of Maine for authority to increase the capital stock of the road from \$15,000 to \$50,000 and to build an extension from its present terminus at Togus through Chelsea and Windsor village, and thence to Weeks Mills and South China village, a distance of 11 miles.

**Lancaster, Oxford & Southern.**—Col. S. C. Slaymaker, of Lancaster, Pa., who has been appointed Chief Engineer of this road, has a party of engineers in the field making surveys for an extension of the present line to Quarryville and to Singery, Pa. The present line is a narrow gauge and is a reorganization of the Peach Bottom road. It extends from Peach Bottom, on the Susquehanna River, in Lancaster County, to Oxford, in Chester County. Since the reorganization was completed last September extensive repairs have been made and a portion of the road has been prepared for standard gauge track. The present line connects with the Columbia & Port Deposit and Philadelphia, Wilmington & Baltimore roads. The contemplated extensions will give it other valuable connections. It has not yet been decided when the contract for changing the gauge or for building the extension will be let, but probably little will be done until next spring.

**Lincoln & West Lincoln Terminal.**—The company has filed articles of incorporation in Nebraska to build a road from a point in the city of Lincoln to the Lincoln stock yards and the packing houses and such manufacturing establishments as may be located within four miles of West Lincoln. The capital stock is \$50,000 and the principal place of business West Lincoln. The incorporators are: E. E. Brown, A. E. Kennard, Charles A. Hanna, C. T. Boggs and Isaac W. Raymond.

**Litchfield, Carrollton & Western.**—H. W. Parkhurst, Chief Engineer of this road, is engaged in making the locating survey from Columbiana, on the Illinois River, and the terminus of a branch of the Jacksonville Southeastern line, westerly and then northerly along the levee on the eastern bank of the Mississippi River to Quincy, Ill., a distance of about 60 miles. The contract for grading is reported to have been let recently to Henry Carroll. As soon as the survey is finished it is expected that a large force will begin the construction of the line.

**Lower Laurentian.**—The line of this road from the end of the Piles branch of the Canadian Pacific to Riviere-a-Pierre, P. Q., on the Quebec & Lake St. John, will be completed in a few weeks. This includes a length of about 40 miles through the new parishes of Notre Dame des Anges, St. Thecle, and Ste. Tite, where some mills have already been erected.

**Macon & Atlantic.**—The article on page 831 of last week's paper under the head of Macon & Savannah referred to the Macon & Atlantic railroad. That line is being built by the Macon & Savannah Construction Co., but it is an entirely distinct organization from the Macon & Savannah.

**Mexican Northern.**—Forty-four miles of this road is at present completed, and it is probable that at least 60 miles of the line will be opened for traffic between Jan. 1 and 15. Nearly a mile of track is being laid daily. The road is being built from the station of Escalon on the Mexican Central, easterly to Sierra Mojada, in the state of Coahuila, Mexico, a distance of about 82 miles.

**Minister Northern.**—The company has been formed at San Jose, Cal., by F. F. Britton, John M. Dennett, J. G. Galvin, W. G. Hawley, Benson Griswold, Ira A. Latta and John R. Patton, to build a narrow-

gauge road from a point on the Pacific Ocean shore, in Sonoma County, to a point on the Garcia River, near Kennedy & Shaw's saw mill.

**Mobile & Girard.**—A meeting of the stockholders was held at Columbus, Ga., recently, at which the action of the directors in voting to issue bonds for the extension of the road to Pollard, Brewton, Pensacola, and Mobile, Ala., at a rate not exceeding \$12,750 per mile, was formally ratified. The total issue of the bonds is not to exceed \$4,000,000, but of this amount \$1,080,000 will be necessary to take up the old bonds of the road, which soon become due. The extension to Pollard will not be over 80 miles, and the Pensacola branch not over 100 miles. There is no intention, however, to build this latter line nor the road to Mobile.

**Mobile & Western.**—The organization of a construction company was completed this week. The road is a reorganization of the Mobile & Northwestern. That line has been partly graded for about 20 miles northwest of Mobile, Ala., toward Jackson, Miss. The new construction company takes over the contract of the Anglo Southern Construction Co.

**Nashville, Chattanooga & St. Louis.**—It is reported that the engineers who were making surveys for the extension north of the Tennessee River to a connection with the Huntsville division at Huntsville and Bell Factory have been ordered to suspend work. It seems to be understood locally that the company will make the connection with the Huntsville division at Huntsville instead of at Bell Factory, as it was at one time thought would be done. The officers have not stated what will be the connecting point. The contractors have laid about 10 miles of track from Littleton, near Attalla, and it is expected that 20 miles will be laid before the close of the year. The grading has been finished on the 25 miles to the Tennessee River, at Gunter-ville. Over 600 men are at work on the southern division. Work has commenced on the draw bridge at Gunterville, and Allison, Shafer & Co., who have the contract for the entire line, are to put a large number of men at work north of the river by Jan. 15. The road is to be ready for operation by next October.

**Newport & Kings Valley.**—Preliminary surveys have been made for an extension of this line from Airlie, Or., northerly through Independence, to Salem and Kings Valley. It is understood that the locating survey will be made shortly, and that if this gives a good route construction work will probably be undertaken very soon.

**New Roads.**—Notice is given that application will be made to the Legislative Assembly of British Columbia at its next session for an act to incorporate a company to construct a road from some point between Point Grey and Port Moody, in the district of New Westminster, and some point between the western extremity of the American boundary at Semiahmoo Bay.

Application will be made to the Dominion parliament at its next session for an act to incorporate a company to construct a road from a point on the Canadian Pacific, between Dog Lake and Sudbury, Ont., thence by way of the valleys of Moose River and of its tributaries to James' Bay.

**New York Central & Hudson River.**—A survey is being made from a point near Utica in a northerly direction through Watertown to the St. Lawrence River at Clayton, N. Y., opposite the Thousand Islands. The route is parallel to the Rome, Watertown & Ogdensburg.

**Northeast Pennsylvania.**—The extension of this branch of the Philadelphia & Reading, which has been under construction since early summer, from Hartsville northeast to New Hope, Pa., on the Delaware River, 16 miles, was completed last week, and the first regular passenger train began running Nov. 29. The extension shortens the distance between Philadelphia and Lambertville, N. J., several miles.

**Northern Pacific.**—On the extension of the Coeur d'Alene division from Mullan, Idaho, eastward to the St. Regis Pass, McLain & Janse, who have the contract, have completed that part of the work and trains are now running for 11 miles. West of the Idaho state line over 90 miles of track has been laid from De Smet, near Missoula, Mont., and it is expected that the entire extension, which will be 120 miles long, will be finished about Jan. 1. The road in Montana is being built under the charter of the Northern Pacific & Montana.

**Oil Valley.**—The articles of incorporation of this company were filed in Pennsylvania Nov. 24. The road is to be built from Watsonstown, McKean County, Pa., to Wilbur Station, on the line of the Western New York & Pennsylvania Railroad, in the same county. The length is five miles. The capital stock is \$50,000. Charles A. Weed, of Binghamton, N. Y., is President.

**Oregonian.**—Standard gauge trains are running on the east side division between Woodburn and Silverton, 20 miles. The track has been laid for some additional miles and most of the remaining distance on this division to Coburg, Or., 30 miles from Woodburn, has been prepared for the rails. When the reconstruction work has been finished to Coburg standard gauge trains will be run between Portland and that point, the tracks of the Oregon & California being used between Woodburn and Portland. The southern extension from Coburg has been graded to Springfield and the track will soon be laid. The railroad has been recently formally transferred to the Southern Pacific and is now being operated as a division of that company's lines. This arrangement may cause the abandonment of the proposed northern extension from Silverton to East Portland, for which surveys have been made. The route is about 54 miles long and is parallel to the Oregon & California between the Willamette River and Portland.

**Pacific Short Line.**—Officials of the Great Northern deny the reports that this line is to be purchased by that company, but say that close traffic relations are being established between the Short Line, the Sioux City & Northern and the Great Northern, which will practically establish a through route between Lake Superior ports and Ogden when the line is completed to that point. The Pacific Short Line is being built under three corporate titles, viz.: The Nebraska & Western, extending from the Missouri River to the Wyoming state line; the Wyoming & Eastern, across Wyoming to the Utah line, and the Salt Lake Valley & Eastern, extending into Utah to Ogden.

**Paducah, Tennessee & Alabama.**—The rains have done great damage to the roadbed of this line between Paducah, Ky., and the Tennessee state line, 40 miles, upon which the track was only recently laid. Cross ties are being distributed between the state line and Paris, Tenn., 15 miles, and the track has been laid on

all but six miles of this distance. Many of the men working on the extension have been transferred to the northern portion of the line, where they are engaged in repairing the injuries caused by the rains. Two large bridges are to be built near Paris. M. S. Carter & Co., of St. Louis, who have the bridge contracts, are rapidly completing this work.

**Pecos Valley.**—Owing to a delay in the receipt of construction material the tracklaying has been temporarily suspended. The work has reached a point in New Mexico 77 miles north of Pecos City, Tex. As a result of the delay the line may not be opened to Eddy, N. M., until February. Eddy is 90 miles from the southern terminus, and the track is now laid to Black River, 13 miles south of the town. There is a little grading yet to be done but if the construction material could be obtained the line would be completed by Dec. 25.

**Peru & Detroit.**—The new branch of the Wabash road between Peru and Chili, Ind., a distance of nine miles, was regularly opened last Sunday, and hereafter the Detroit trains on the road will be run that way instead of between Logansport and Chili. There will be an accommodation train run between the two latter points, but all through traffic will be by way of Peru. Peru has also been made the terminus of the Detroit branch instead of Logansport. The Detroit and Toledo branches of the Wabash join near Logansport and the line to Detroit is about three miles shorter by that route than by way of Peru and Chili, but between Logansport and Clymers, a station west of it, the Wabash had to use the tracks of the St. Louis, Vandalia & Terre Haute for about five miles.

**Philadelphia & Reading.**—Surveys have been made for the laying of tracks to connect the Norristown branch of the road with the Port Richmond line, a short distance south of Falls Station, Pa. The connection, it is thought, is to increase the freight handling facilities of the company.

**Portland & Rumfield Falls.**—This company has applied for articles of incorporation in Maine to build the proposed extension of the Rumfield Falls & Bucksfield road from Gilbertville westerly to Canton, about 15 miles. The capital stock is \$100,000.

**Reading & Southwestern.**—The company has been chartered to build a road from the business centre of Reading to Mohrsville, five miles to the southwest, passing through Oakland, Shillington and Hendleton.

**Rio Grande Southern.**—The tracklaying has been completed from Dallas through Ridgeway through Placerville to Telluride, a distance of about 46 miles. The first train over the road was run Nov. 23. Telluride is at the end of a branch and about nine miles from the main line. The road from Ridgeway follows Leopan and Dallas creeks and the San Miguel River to Telluride. About 1,000 men are still engaged on the construction work. Over 90 miles of the line has been graded. From Telluride the route is to the head of the Dolores River and along the river to Rico and thence southeasterly to Durango, a distance of about 172 miles from the northern terminus. A large part of the grading has been completed between Durango and Rico, and five miles of track has been laid from the former point. It is expected to complete the entire main line next spring. There is much rough work on the line. The maximum grades are three per cent, and the maximum curves 30 degrees. There is a trestle 800 ft. long and a Howe truss bridge 202 ft. long and 145 ft. high. Carlisle & Weitbre, of Pueblo, are the contractors.

**Rio Grande Western.**—The branch from Thistle on the main line, south through the Sevier Valley, which was completed to Mount Pleasant, San Pete County, Utah, a distance of 45 miles, a short time ago, has been placed in operation. The stations on the extension are Thistle, Nebo, Indianola, Hill Top, Millburn, Fairview and Mount Pleasant.

**Rome, Watertown & Ogdensburg.**—It is reported that if the New York Central builds the proposed extension to Thousand Islands this company will connect its two terminal points at Rome and Utica by building a short piece of road and then build an extension from Utica to a point near Rotterdam Junction, perhaps 80 miles, to connect with the Fitchburg system. If such a project were carried out the New York Central would be paralleled practically from Buffalo to Albany.

**St. Louis & Superior.**—The surveys have been nearly finished for this road, which is to extend from Superior, Douglas County, Wis., southwesterly near the south bank of the St. Louis River to a point opposite Fond du Lac, the head of navigation; also from St. Louis, crossing the river of the same name upon a drawbridge, then down the river to Duluth, Minn. The two lines will be about 20 miles long. Three miles of the line is now under contract. The balance will be let as soon as the right of way can be procured. Davis & Cooper, of West Duluth, are the contractors for the three miles, and have 150 men at work. Two miles of the road will have a two per cent. grade and four degree curves. On the balance of the line the grades are 0.7 per cent, and the maximum curves are four degrees. There will be one iron and steel drawbridge and one pile and trestle bent 1,400 ft. long and 32 ft. high. C. E. Russell is Chief Engineer.

**Savannah, Americus & Montgomery.**—The tracklaying on the Montgomery extension was begun several weeks ago at Hartsboro, Ala., where the Mobile & Girard is crossed, and a good portion of the track between that point and the Chattahoochee River has been laid. Over 25 miles of grading has been finished between the two points and also for about 15 miles west of Hartsboro. There will be a large bridge over the Chattahoochee River west of Louvale at Fitzgerald's Landing. This will not be completed for several months, but in the mean time the grading and tracklaying will be continued to Montgomery, and that part of the work probably completed in May.

**Seattle & Montana.**—Rapid progress is reported on the grading of this road between Seattle and Jarman Prairie, about nine miles north of the Skagit River. Connection is made at that point with the Fairhaven & Southern, which is controlled, as well as the Seattle & Montana, by the Great Northern. The grading has been finished through Marysville and Mount Vernon. The line will be 77 miles long from Seattle to the connection with the Fairhaven & Southern near Sedro.

**Southern Central.**—The company filed a charter in Pennsylvania, Dec. 1, for a road 55 miles long, to extend from a point near the western end of the railroad bridge of the Shamokin, Sunbury & Lewisburg road across the Susquehanna River at Sunbury, Pa., to a point in the city of Harrisburg. The road will be built



through the counties of Snyder, Perry and Dauphin. The capital stock is \$500,000. C. Watson McKeehan, Philadelphia, is president.

**Southern Pacific.**—Maj. B. M. Temple is completing the survey for the proposed cut-off on the line of the Galveston, Harrisburg & San Antonio, between Comstock and Shumla, Tex. The new road leaves the main line about 4½ miles west of Comstock and rejoins it at Shumla, the distance being 13 miles. The present line is 25 miles long. As already stated, Ricker, Lee & Co., of Galveston, have the contract for the grading and masonry. They are to complete the work within nine months and have already put a force of men at work. The maximum grades of the new line will be 52.8 ft. per mile and maximum curves six degrees. The bridge across the Pecos River will be an iron viaduct about 800 ft. long and 325 ft. high from the base of rail to ordinary water level. These figures correct those given last week.

**Staten Island Midland.**—Articles of incorporation of the company were filed in the office of the Secretary of State, at Albany, N. Y., Dec. 1. The company has a capital of \$150,000, with the principal office at Stapleton. The company is formed for completing and operating the Richmond County road, which was sold under foreclosure to William O. Ross and Joseph M. Tuttle in June last.

**Temiscouata.**—The branch of this road to Claire's, a point opposite Fort Kent, Me., on the St. John's River, a distance of 22 miles, has been opened for traffic, and trains are now running regularly over it.

**Union Pacific.**—The work of excavating Tumwater tunnel, near Olympia, Wash., on the Portland and Tacoma extension, has been commenced. The cut is through running sand, and heavy breastworks will be constructed to keep the sand from falling. The first intention was to make a tunnel 600 ft. in length, but this was afterward changed and the distance through will be but 200 ft. It is 100 ft. below the surface of the road and is lined with timber.

**Waco, Lampasas & Llano.**—The contract for the construction of this road was let to the Llano Construction Co., of Lampasas, Tex., last week. The company was organized by the incorporators of the road soon after the charter for the railroad had been filed. The grading was commenced at Lampasas this week. The work is in charge of C. A. Gilchrist, of Fort Madison, Ia., the Chief Engineer.

**Wadena & Park Rapids.**—Grading for this line has been completed, and the bridge piling has been driven as far as Blueberry River. Work has commenced on a roundhouse and brick depot at Park Rapids, Minn.

**Westerly & Jewett City.**—William G. Smith, of Waterbury, Conn., with a party of assistants, is making a new survey for this road, between Westerly, R. I., and Lisbon, Conn. The new survey was commenced Nov. 8 and has now been completed through Rockville and Voluntown to a point about 15 miles from Westerly. The line is about 25 miles long and about half the mileage will be in each of the two states. The line will connect with the New York & New England near Lisbon, with the New York, Providence & Boston, at Westerly.

**White River.**—About 100 men are said to be engaged in clearing the right of way and grading this road at Buckley, Wash. Only five miles of the road will be built at present. Surveys have been made for several miles east and west of Buckley. Richard Hany is Assistant Chief Engineer.

#### GENERAL RAILROAD NEWS.

**Chicago, Evanston & Lake Superior.**—Articles of consolidation of the Chicago & Evanston and the Chicago & Lake Superior, under the name of the Chicago, Evanston & Lake Superior Railroad Co., were filed in the offices of the Secretary of State, at Springfield, Ill., Dec. 2.

**Cincinnati, Lebanon & Northern.**—The work of reconstructing this narrow gauge road and changing the track to standard width was completed last week between Cincinnati and Dodd's, O., 36 miles.

**Davenport, Iowa & Dakota.**—This road will be hereafter operated by the Burlington, Cedar Rapids & Northern, that company having purchased the outstanding bonds and receiving the stock in virtue of that purchase. The road was built last year between Davenport and New Liberty, on the Burlington, Cedar Rapids & Northern, a distance of 30 miles, but it has never been operated.

**Dayton, Fort Wayne & Chicago.**—The Circuit Court at Dayton, O., has ordered the appraisal of the Ironton and Chicago division of this road, and as soon as that has been finished the road will be ordered sold under the various claims against it. The principal indebtedness included in the first mortgage bonds and the Receiver's certificates. The company operates 200 mile of road, of which 20 miles is leased.

**Eastern Minnesota.**—The state railroad commissioners of Minnesota last week gave a hearing to a committee from Hinckley in that state which asked that the commission compel this company to continue to operate the five mile branch called the Kettle River Branch, which extends from Hinckley to Sandstone. The branch was built by the St. Paul & Duluth, and was leased with other track to the Eastern Minnesota. It has not been operated since May.

**Empire & Dublin.**—Judge Roberts, at Macon, Ga., has appointed a receiver for the road, at the instance of the Fourth National Bank, of Chattanooga, and the Springfield Malleable Iron Co. The estimated liabilities of the road are \$400,000. John W. Hightower, formerly Vice-President, is the receiver.

**Kansas City & Southern.**—A meeting of the stockholders was held in Kansas City, Nov. 24, at which it was decided to increase the capital stock from \$110,000 to \$300,000. It is also proposed to issue first mortgage bonds to the amount of \$300,000, and a meeting will probably be held very soon to vote on the question.

**Lehigh & Hudson River.**—At the annual meeting of the road in New York, Dec. 2, the purchase of the Orange County Railroad was ratified. It extends from Greycourt, N. Y., to the Poughkeepsie bridge, giving the Lehigh & Hudson an outlet to Boston and New England points. It has a capital stock of \$200,000. The company also ratified the purchase of a new connecting road opened a week ago, known as the Philadelphia & South Easton, which extends from Easton, Pa., to a point on the Belvidere division of the Pennsylvania

road north of Phillipsburg, N. J., cutting off a Y of several miles. The new bridge built across the Delaware River gives a continuous run from the Easton station of the Central of New Jersey to Maybrook Junction and Campbell Hall.

**Missouri, Kansas & Texas.**—The receivers have obtained authority from the United States court to enter into a contract with the Sherman, Denison & Dallas to operate that road between Sherman and Denison, Tex., 10 miles. The ballasting has been completed on the line and passenger trains are now running, as well as freight. It is reported that the receivers are making arrangements to secure control of the Denison & Washita Valley, which is now completed between Denison, Tex., and Colgate, I. T., 64 miles.

**New York & New England.**—At the annual meeting of the stockholders of the Providence & Springfield Railroad Dec. 3 the form of lease to the New York & New England Railroad for 99 years was unanimously ratified by a stock vote.

**Pennsylvania.**—The earnings of the lines east of Pittsburgh and Erie are given in the following table:

October.	1890.	1889.	Inc. or dec.
Gross earnings.....	\$6,152,901	\$5,857,772	I. \$335,129
Net earnings.....	2,637,849	2,140,165	I. 497,684
Jan. 1 to Oct. 31:			
Gross earnings.....	55,237,072	50,526,380	I. 4,710,692
Net earnings.....	17,488,957	17,018,591	I. 470,366

The October statement shows an increase of 5.8 per cent. in gross, a decrease of 4.3 per cent. in operating expenses, and an increase of 23.4 per cent. in net earnings over the corresponding month of last year. For the ten months ending Oct. 31 gross increased 9.3 per cent., but owing to an increase of 12.6 per cent. in expenses, net increased only 2.7 per cent. All lines west of Pittsburgh and Erie for October, 1890, as compared with the same month in 1889, show an increase in gross earnings of \$148,594; an increase in expenses of \$134,923, an increase in net earnings of \$13,671. The ten months of 1890, as compared with the same period of 1889, show an increase in gross earnings of \$4,170,692; an increase in expenses of \$2,830,676; an increase in net earnings of \$1,340,290.

**Philadelphia & Reading.**—The following table gives the earnings of the railroad company for month of October, 1890, compared with same month of 1889:

Earnings from traffic:	1890.	1889.	Inc. or dec.
Gross receipts.....	\$2,123,531	\$1,930,114	I. \$193,417
Operating expenses.....	1,106,790	979,425	I. 127,365
Profit in operating.....	\$1,017,051	\$950,689	I. \$66,362
Other sources:			
Net receipts.....	48,214	71,236	D. 23,022
Profit for month.....	\$1,065,265	\$1,021,924	I. \$43,341
Profit from Dec. 1 to date.	8,793,876	8,076,418	I. 717,458

\*The increase in expenditures was caused by the settlement of claims brought against the company on account of the accident at Shoemakersville, in September last.

The statement of the Philadelphia & Reading Coal and Iron Co. for the same period shows: Gross receipts, \$2,151,900; decrease, \$78,111; operating expenses, \$1,918,757; decrease, \$205,799; gross receipts to Oct. 31, \$16,930,202; increase, \$908,655; operating expenses to Oct. 31, \$16,370,944; increase, \$569,258.

**Syracuse & Baldwinsville.**—This road will be sold at Syracuse, N. Y., Jan. 2 next, by virtue of a judgment of the Onondaga County court made last May. The order was made in a suit brought by the Central Trust Co., of New York, trustee of the first mortgage bonds. The road is seven miles long, extending from Amboy to Baldwinsville, N. Y.

**Union Pacific.**—The preliminary statement of the road for October shows: Gross earnings, \$4,306,692; increase, \$5,294; net earnings, \$1,482,595; decrease \$482,450. The expenses show an increase of \$487,723. For the ten months to Oct. 31: Gross earnings, \$35,559,783; increase, \$3,485,502; net earnings, \$12,019,294; decrease, \$783,595. The expenses increased \$4,269,088.

#### TRAFFIC.

##### Chicago Traffic Matters.

Chicago, Dec. 3, 1890.

At the meeting of executive officers of the roads west, southwest and northwest of this city yesterday it was agreed to advance west bound freight rates to the basis of seventy-five cents, first class, between Chicago and Missouri River points, taking effect Jan. 1. This will make west bound rates the same as east bound. It was also agreed to advance the rates on grain from the Missouri River and points beyond. From Missouri River points the rate on corn is to be advanced from 17 to 19 cents per 100 lbs., on oats, rye and barley from 17 to 21 cents, and on wheat and flour from 20 to 22 cents. A proportionate advance from Kansas and Nebraska points was agreed upon. It will be noticed that these rates are higher than those prescribed by the Interstate Commerce Commission in its famous order. An advance of 1½ cents was also agreed upon on cattle, making the new rate 23½ cents from Missouri River points to Chicago. The Alton insisted upon its original proposition in regard to equalizing the rates on hogs and packing-house products, and it was agreed to reduce the rate on hogs from 25 to 18½ cents, taking effect Dec. 22. But the meeting voted to increase the St. Louis differential on live hogs, making the rate from Kansas City to St. Louis eight cents. This may have a serious effect on the Alton's traffic in this commodity. It was voted to withdraw all commodity rates Jan. 1, and all the changes except the hog rate take effect on that date.

At the meeting of the Western Passenger Association to-day it was agreed that the passenger rates from Chicago to Pacific Coast points, by way of St. Louis, should be advanced on Dec. 15 from \$72.50 to \$75 first class, and from \$47.50 to \$50 second class.

The Special Committee of the Western Passenger Association on the northwestern situation will report to the Managers to-morrow. It is understood that their report will submit a plan for a division of business substantially similar to that now in operation in regard to freight in the southwest.

It is understood that the Atchison will take an appeal under the association rules from the decision of Chairman Finley in the mileage ticket matter.

The Central Traffic Association has issued notice that the practice of shipping liquor in "over casks" must hereafter conform to the interstate Commerce law, and contents must be correctly described in shipping receipts and dray tickets.

The Joint Committee of the Central Traffic Association

has decided that, taking effect Dec. 8, the roads east of Cincinnati shall be allowed 22 per cent. of the authorized tariffs as their proportion of the through rates on east-bound Trans-Continental traffic via Cincinnati to seaboard points, the Trans-Continental classification rates and rules authorized to govern via Chicago and St. Louis and intermediate gateways to govern via Cincinnati. Also, that taking effect on the same date on export freight which is covered by through foreign bills of lading or consigned to the care of one foreign freight agent and shipped under the conditions provided by Rule 3A of the official classification, more than one bill of lading may be issued for separate lots at the carload rate, provided the entire carload is consigned through one port of export.

The Atchison will open its new line between Chicago and St. Louis Dec. 21. The route is over the Atchison and Jacksonville Southeastern, and it is proposed to run two through passenger trains each way, daily.

The State of Iowa, by Attorney General Stone, has filed in the District Court at Council Bluffs petitions in equity against the Chicago & Northwestern, Chicago, Rock Island & Pacific, Chicago, Burlington & Quincy and Chicago, St. Paul, Minneapolis & Omaha roads for violating the order recently made by the Board of Railroad Commissioners that on and after Oct. 25 the maximum rate within the state on intra-state joint business shall be 80 per cent. of the schedule of reasonable maximum rates as fixed by the Board, and praying for an order and injunction.

It has been reported to Chairman Finley that the Atchison, Topeka & Santa Fe is sending representatives through Michigan with instructions to offer agents a commission of \$3 a ticket on Kansas City fares. This is \$2 more than the established commission.

The "Counselman case" which you report in another column of this issue has been enlarged to include another reluctant witness and Judge Gresham will undoubtedly rule on both cases together. If he confirms Judge Blodgett's decision both cases will doubtless be taken to the Supreme Court. The new case is that of James C. Peasley, treasurer of the Chicago, Burlington & Quincy, who is held not only for failing to answer questions, but especially for his refusal to produce the books and papers of the company. A claim is made that the Chicago, Burlington & Quincy has been paying rebates to individuals, among them C. D. S. Gallup, of N. H. Warren & Co. Mr. Peasley declined to talk, on the ground that he might tend to incriminate himself, and he refused to produce the books because they did not belong to him and he was not obliged to incriminate a company he worked for.

Judge Blodgett said that Peasley, being only the custodian of the documents, would not incriminate himself by giving the necessary testimony. The Grand Jury had a right to see any evidence which related to this investigation. He imposed a fine of \$500, with directions that Mr. Peasley stand committed until paid and until the questions were answered. As in the Counselman case, a petition for habeas corpus will be filed.

#### Traffic Notes.

The trunk lines have again agreed to discontinue the running of tourist cars either in special or regular service.

A daily through sleeping car line has been established between Mexico City and St. Louis, via the St. Louis & San Francisco, Atchison, Topeka & Santa Fe and Mexican Central roads.

The Boston & Maine has slightly reduced passenger rates from Boston to points south and west via the Poughkeepsie Bridge line. The other lines do not as yet appear to be much disturbed.

Charges have been preferred against the Louisville & Nashville for violating the Interstate Commerce Law by giving free transportation to delegates to the Farmers' Alliance Convention at Ocala, Fla.

The wheat crop of Washington is estimated at 16,000,000 bushels, and the inability of the railroads to move the cars to market is exasperating the farmers, who are charging the roads with collusion with the warehousemen to lower the price of wheat.

The "Soo" line has announced an advance in through freight rates from New York to St. Paul. The advance is from 77 cents to \$1.10 first class and is effective Dec. 5. It applies only via the New York, Ontario & Western. The rates out of New York via the Canada Atlantic remain upon a basis of 77 cents. The rates from Boston also remain unchanged.

The United States Grand Jury at Dubuque, Ia., is investigating charges preferred against the Chicago, St. Paul & Kansas City by the local agent of the Illinois Central, alleging that a Kansas City ticket clerk gave a purchaser of a ticket to St. Louis via Chicago the address of a ticket broker in Chicago, where he could dispose of the remainder of his ticket.

#### East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, Nov. 29, amounted to 70,892 tons, against 78,810 tons during the preceding week, an decrease of 7,918 tons, and against 69,633 tons during the corresponding week of 1889, an increase of 1,259 tons. The proportions carried by each road were:

	W'k to Nov. 29.		W'k to Nov. 22.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	8,860	12.5	8,930	11.4
Wabash.....	5,527	7.8	4,729	6.0
Lake Shore & Michigan South.....	1,748	18.0	13,563	17.2
Pitts., Ft. Wayne & Chicago.....	7,402	10.4	9,197	11.6
Chicago, St. Louis & Pitts.....	10,517	14.9	11,337	14.4
Baltimore & Ohio.....	3,985	5.6	4,628	5.9
Chicago & Grand Trunk.....	8,010	11.3	9,389	11.9
New York, Chic. & St. Louis.....	7,538	10.7	10,007	12.7
Chicago & Erie.....	6,255	8.8	6,991	8.9
Total.....	70,892	100.0	78,810	100.0

Of the above shipments 2,179 tons were flour, 31,365 tons grain, 5,532 tons millstuffs, 2,019 tons cured meats, 1,922 tons lard, 5,046 tons dressed beef, 582 tons butter, 1,052 tons hides, 150 tons wool, and 7,200 tons lumber. The two Vanderbilt lines together carried 41.2 per cent. while the two Pennsylvania lines carried 25.3 per cent. During the week the lake lines carried 44,715 tons, against 44,189 tons during the preceding week. Of the shipments 11,368 tons were flour and 28,341 tons were grain.